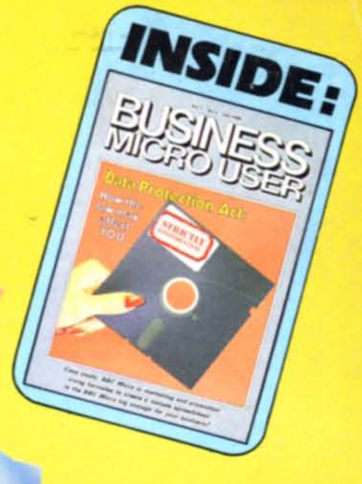
A Database Publication

THE MICRO USER

Volume 4
Number 5
July 1986
£1.25

Top-selling guide to the BBC Micro!

INSIDE:


BUSINESS MICRO USER
Data Protection Act

P·L·A·Y·T·H·E
Royal Wedding
G·A·M·E

Under test: Le Modem

View printer driver generator

Making the most of the Master

UP-TO-THE-MINUTE GUIDE TO ROM SOFTWARE

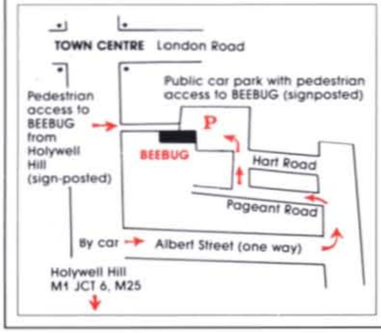
BEEBUG RETAIL

BEEBUG SHOWROOM AND MAIL ORDER

The products in this price list are available in our showroom in St. Albans and by mail order. Telephone your order on 0727 40303 or send the order form to the address below. Alternatively come along and see us. We are open 9 - 5.30 Mon - Sat, and there is ample parking at the rear of our premises.

We take both Access and Visa credit cards. Simply telephone us on our multi-line telephone number 0727 40303 quoting: Cardholder's Name, Cardholders Address, Cardholder's Telephone number, Credit Card number, expiry date, order details.

PLEASE NOTE: that the mail order despatch address must be the same as the cardholder's address.


TOWN CENTRE
London Road
Public car park with pedestrian access to BEEBUG (signposted)
Pedestrian access to BEEBUG from Holywell Hill (sign-posted)
P
BEEBUG
Hart Road
Pageant Road
By car
Albert Street (one way)
Holywell Hill
M1 JCT 6, M25

BEEBUG MAIL ORDER
Dolphin Place, Holywell Hill,
St.Albans, Herts. AL1 1EX
Tel: 0727 40303 — Multi-lines

- Computers
- Printers
- Monitors
- Disc Drives
- Budget Discs
- Software

COMPUTERS

Special Offers

The Acorn Second Processors are reduced this month, along with other Acorn add-ons. The IEEE Interface is a new addition to our range, allowing connection of scientific instruments to your Beeb, priced at £315

Disc Starter Pack

We are pleased to continue the special Disc Starter Pack for users who are still cassette-based. Consisting of an Acorn 1770 disc interface, Cumana CSX100 drive, Disc Drive Guide, and 10 Beebug discs all for only £170, this will finally dispense with laborious loading from cassette!

Code	Description	Price Inc VAT
0200	Master 128	**489.00**
0202	Master ET	**389.00**
0230	65C102 Co-Processor 6502 'Turbo'	**115.00**
0234	M128 Econet Module	**48.00**
0235	M128 Eprom Cartridge	**14.00**
0240	M128 Reference Manual 1	**14.50**
0241	M128 Reference Manual 2	**14.50**
0242	M128 Advanced Ref Manual	**19.50**
0203	'6502' 2nd Processor	**187.00**
0204	'Z80' 2nd Processor	**364.00**
0205	Acorn Prestel Adaptor	**128.00**
0206	Acorn Teletext Adaptor	**138.00**
0237	Acorn IEEE Interface	**315.00**
0217	1770 Disc Interface Kit	**48.00**
0218	ADFS Upgrade for 1770 DFS	**29.00**
0208	1.2 Operating System	**5.35**
0209	1.2 DNFS Rom	**19.50**
0210	A to B Upgrade Kit	**69.00**
0212	Acorn Speech Upgrade	**46.00**
0214	Watford DDFS Kit + Manual	**60.00**
0222	Disc Starter Pack	**170.00**
0223	Acorn 1.2 Disc Upgrade Kit	**89.00**
0224	BBC Carrying Case	**14.95**

MONITORS

The Microvitec 1451 is our most popular RGB monitor and is this month reduced to only £260. The 1451 is especially suited for high resolution colour graphics and 80 column word processing. The CT2007 monitor has similar features with the added attraction of television, all for only £225

0501	Taxan KX1202 12" Green Long Perst.	**116.00**
0502	Taxan KX1203 12" Amber Long Perst.	**116.00**
0503	Zenith 123 12" Green	**82.80**
0504	Zenith 122 12" Amber	**87.40**
0556	Monitor Lead BNC for Taxan/Zenith	**3.90**
0530	Microvitec 1431 Med-res Monitor	**206.00**
0531	Microvitec 1451 Hi-res Monitor	**260.00**
0532	Philips CT2007 14" TV/Monitor	**225.00**
0534	Philips CT1114 14" TV/Monitor	**200.00**
0550	Monitor Lead RGB for M'vitec/Philips	**5.75**
0535	Supervision III RGB Monitor	**379.99**
0555	Supervision Monitor Lead	**7.00**
0570	Stand for Supervision (KTS2)	**29.00**
0552	Single Plinth for Monitor	**12.65**
0553	Double Plinth for Monitor	**23.00**

PRINTERS

Colour

The Canon PJ1080A colour printer gives excellent colour graphics when used in conjunction with our own Dumpmaster II rom.

Plotters

The popular Plotmate Plotter finally has it's long awaited big brother, which creates high quality drawings using plot/draw commands up to A3 in size.

0300	Brother HR 15 Daisywheel	**325.00**
0302	Canon PW1156A 15"	**405.00**
0303	Canon PJ1080A colour	**460.00**
0304	Epson LX 80	**230.00**
0313	LX80 Tractor Feed Unit	**23.00**
0315	LX80 Cut Sheet Feeder	**55.00**
0306	Epson FX 80 (while stocks last!)	**273.00**
0308	Epson JX 80 Colour Printer	**520.00**
0318	Epson HI 80 Plotter	**380.00**
0319	Epson FX85 NLQ Printer	**438.00**
0309	IBICO LTR1 Letter Quality	**132.00**
0310	Juki 6100 Daisywheel Printer	**359.00**
0311	Taxan KP810 NLQ Matrix Printer	**265.00**
0340	Lin. Graph. Plotmate A4 Plotter	**340.00**
0331	Lin. Graph. Plotmate A3M Plotter	**630.00**
0316	Taxan KP910 15" NLQ Matrix Printer	**390.00**
0400	Printer Roller Cleaner Kit	**6.00**
0401	2M Printer Lead	**8.00**
0402	Ribbon for Epson FX/RX/MX80 FX85	**3.00**
0403	Ribbon for Epson FX/RX100 FX105	**4.00**
0408	Ribbon for Canon PW/Taxan KP/Cen.H80	**5.00**

0413	Ribbon for Epson LX 80	**4.50**
0415	Ribbon for Epson JX 80	**14.95**
0418	Ribbon for Juki 6100 (Single Strike)	**1.55**
0414	Ibico Ink Roller	**4.60**
0406	Paper 2000 sheets 11x9.5" 70gsm	**14.50**
0452	Paper 2000 sheets Real A4 80gsm	**28.75**
0453	Paper 1000 sheets 2–part carbonless	**23.00**
0407	3.5"*1 7/16" Labels 1000	**4.00**
0416	Dust Cover KP810/PW1080A	**5.45**
0404	Daisywheel for Juki 6100	**20.50**
0405	Daisywheel for HR–15	**20.50**
0419	Fontaid ROM & Disk 40T	**30.00**
0420	Fontaid ROM & Manual 80T	**30.00**
0421	Fontaid Extra Disc "A" 40T	**15.00**
0422	Fontaid Extra Disc "A" 80T	**15.00**
0432	TCS26 Printer Sharer	**22.49**

DISC DRIVES

The Acorn hard disc drives are a new addition to our range, giving extensive storage space with Level 3 fileserver software as standard. (S–single drive, D–dual drive, X–excluding power supply unit)

0622	Acorn 10MB Winch with f'server	**1250.00**
0623	Acorn 30MB Winch with f'server	**1850.00**
0600	Cumana CSX100 100K 40T	**110.00**
0610	Cumana CS100 100K 40T	**140.00**
0601	Cumana CDX200 200K 40T	**218.00**
0602	Cumana CSX400 400K 40/80T	**150.00**
0603	Cumana CS400S 400K 40/80T	**170.00**
0604	Cumana CD800S 800K 40/80T	**330.00**
0614	Cumana CS100E 100K 40T	**130.00**
0615	Cumana CS400E 400K 40/80T	**165.00**
0654	Disc Storage Box – up to 50 discs	**9.00**
0655	Lockable Disc Box holds 35	**13.80**
0656	Lockable Disc Box holds 85	**17.25**

Dynamic Discs

Price includes postage and free storage box

0657	Beebugsoft 10x 48TPI SS DD Discs	**13.90**
0658	Beebugsoft 10x 48TPI DS DD Discs	**18.90**
0659	Beebugsoft 10x 96TPI SS DD Discs	**18.90**
0660	Beebugsoft 10x 96TPI DS DD Discs	**19.90**
0661	Beebugsoft 25x 48TPI SS DD Discs	**33.50**
0662	Beebugsoft 25x 48TPI DS DD Discs	**43.90**
0663	Beebugsoft 25x 96TPI SS DD Discs	**43.90**
0664	Beebugsoft 25x 96TPI DS DD Discs	**46.20**
0665	Beebugsoft 50x 48TPI SS DD Discs	**53.90**
0666	Beebugsoft 50x 48TPI DS DD Discs	**77.90**
0667	Beebugsoft 50x 96TPI SS DD Discs	**77.90**
0668	Beebugsoft 50x 96TPI DS DD Discs	**84.90**

OTHER HARDWARE

The AMX Mouse and associated software are all on special offer at present. This is a limited offer, and prices can only be maintained while stocks last. Similarly the range of Voltmace joysticks are reduced for a limited period.

Music 500

The Acorn Music 500 joins our range of musical add–ons. This allows the Beeb to produce sounds of professional standards. It includes an impressive demonstration cassette.

0701	Aries B32 RAM Card	**86.00**
0702	Watford 32K RAM Card	**65.00**
0703	AMX Mouse	**69.00**
0704	ATPL ROM Board for Model B	**39.00**
0735	ATPL Battery Backup kit	**17.00**
0740	Aries B12 Rom Board	**45.00**
0749	Aries B12C Adaptor	**6.90**
0736	Watford Mk12 Rom Board	**36.80**
0737	Watford Battery Backup	**3.45**

0755	Write Protect for Mk12	**2.30**
0705	2764 8K eprom	**3.45**
0706	27128 16K eprom	**4.60**
0707	6264 8K ram	**4.50**
0708	Eprom Extractor Tool	**3.45**
0709	Watford Eprom Eraser	**32.20**
0747	U.V. Tube for Eprom eraser	**10.35**
0710	Softlife Eprom Blower	**75.90**
0714	BBkey Function Key Labels	**2.00**
0715	Dust Cover for BBC	**2.99**
0716	Music 500	**114.00**
0717	Watford Sideways ZIF	**17.25**
0718	Voltmace Delta 3B Single Joystick	**10.00**
0719	Voltmace Delta 3B Twin Joystick	**17.00**
0720	Voltmace Delta 14B Joystick.	**12.50**
0721	Voltmace Delta 14B/1 Interface.	**12.50**
0741	Voltmace Delta ASC	**8.50**
0742	Delta Driver Disc 40T	**9.00**
0743	Delta Driver Disc 80T	**9.00**
0744	Delta Driver Cassette	**5.00**
0726	8 way DIP switch	**0.98**
0727	RS423 domino plug	**0.46**
0728	RGB 6 pin DIN plug	**0.46**
0729	Cassette 7 pin DIN plug	**0.30**
0730	3–core 6 amp Mains Cable per m	**0.36**
0731	4–core RS423 Cable per m	**0.60**
0732	6–core RGB or Cassette Cable per m	**0.50**
0761	Nightingale/Commstar Combo Pack	**140.00**

SOFTWARE

Latest titles include Micros in Business priced at £65 which is an excellent demonstration of how to use micros in an office environment. The View range are on offer this month, including View 3.0 which at £69 incorporates the Printer Driver Generator.

1000	Acornsoft View	**45.00**
1001	Acornsoft View Sheet	**45.00**
1002	Acornsoft Hi–View	**45.00**
1019	Acornsoft Viewstore ROM	**45.00**
1021	Acornsoft Viewindex Disc	**11.00**
1022	View 3.0 Rom	**69.00**
1003	Acornsoft Lisp Rom	**48.00**
1004	Acornsoft BCPL	**51.00**
1026	BCPL Standalone Generator	**48.00**
1005	Acornsoft Comal	**48.00**
1006	Acornsoft Logo	**65.00**
1007	Acornsoft ISO Pascal	**65.00**
1028	Pascal Standalone Generator	**32.00**
1008	Acornsoft Basic Editor	**28.00**
1011	BBCsoft UltraCalc 2	**70.00**
1013	View Printer Driver Cassette	**8.00**

1014	View Printer Driver Generator Disk	**9.00**
1015	Acornsoft Revs Disc	**17.00**
1024	Acornsoft Revs Cassette	**14.00**
1029	Revs 4 Tracks Disc	**11.95**
1032	Revs 4 Tracks Tape	**9.00**
1016	Acornsoft Aviator Disc	**17.00**
1017	Acornsoft GXR B	**28.00**
1018	Acornsoft GXR B+	**28.00**
1027	Micro PROLOG	**74.00**
1031	Acornsoft Termulator Rom	**30.00**
1033	Microtext Rom	**53.00**
1034	Microtext Plus	**240.00**
1035	6502 Development Pack	**45.00**
1036	6502 2nd Proc Elite	**18.00**
1038	Database Disc	**14.50**
1039	Creative Sound Disc	**19.00**
1040	Micros in Business Disc	**65.00**
1100	Wordwise Plus	**46.00**
1102	Wordwise	**28.00**
1103	C.C. Graphics ROM	**25.00**
1104	Printmaster (Epson)	**28.00**
1105	Printmaster (Star)	**28.00**
1106	Accelerator	**56.00**
1107	Speech ROM	**28.00**
1108	Acorn Speech Processor (with 1107)	**10.00**
1109	Disc Doctor	**28.00**
1110	Intersheet	**47.70**
1111	Hi Intersheet Disc	**5.75**
1112	Hi Wordwise Plus Disc	**5.75**
1113	Caretaker Rom	**28.00**
1114	Interchart	**29.90**
1115	Speech System inc TTS	**33.50**
1118	White Knight Mk 12 Disc	**18.40**
1119	White Knight Mk 12 Cassette	**9.50**
1123	"SPEECH!" Disc 40/80T	**11.95**
1150	AMX Desk Disc	**19.00**
1151	AMX 3D Zicon Disc	**19.00**
1152	AMX Database Disc	**19.00**
1153	AMX XAM	**19.00**
1154	AMS Pagemaker Plus	**40.00**
1155	AMS Superart Rom	**40.00**
1156	AMX Paint Pot Disc	**11.00**
1160	AMX Utilities	**11.00**
1170	Fleet Street Editor 40T	**34.00**
1171	Fleet Street Editor 80T	**34.00**
1172	Mini Office II Cassette	**14.50**
1173	Mini Office II 40T	**16.50**
1174	Mini Office II 80T	**16.50**

ORDER FORM

CARRIAGE. Please **add £1.00** carriage to all orders except Computers, Monitors, and Printers **add £7.00.** Disc Drives, 2nd Processors, Modems etc. **add £5.00.** Listing Paper **add £2.00.**

BEEBUG MAIL ORDER
Dolphin Place, Holywell Hill,
St.Albans, Herts. AL1 1EX
(Dolphin Place is opposite
18 Holywell Hill in the centre
of St.Albans).

CODE	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL

NAME: SUB TOTAL £
ADDRESS: CARRIAGE £
POSTCODE: TOTAL £

ACCESS/BARCLAYCARD NO: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

In accordance with our competitive pricing structure prices are subject to alteration at any time.

Vol. 4 No. 5 July 1986

Managing Editor
Derek Meakin
Features Editor
Mike Bibby
Deputy Features Editor
Peter Davidson
Production Editor
Peter Glover
Art Editor
Heather Sheldrick
Associate Editor
Alan McLachlan
Reviews Editor
Christopher Payne
News Editor
Mike Cowley
Technical Editor
Mike Cook
Advertisement Manager
John Riding
Advertising Sales
Mike Hayes
Peter Babbage
Editor in Chief,
Database Publications
Peter Brameld

Tel: 061-456 8835 (Editorial)
061-456 8383 (Admin.)
061-456 8500 Advertising)
061-480 0171 (Subscriptions)
Telecom Gold: 72:MAG001
Telex: 265871 MONREF G
Quoting Ref. MAG001
Prestel Mailbox: 614568383

Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

Subscription rates for
12 issues, post free:

£15 – UK & Eire (Sterling only)
£25 – Europe
£42 – Rest of world (airmail)

ABC 55,496
July-December 1985

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1986 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

News trade distribution: Diamond Europress Sales & Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

REGULARS

11 News

All the latest happenings and new arrivals in the ever changing world of your BBC Micro.

51 Machine code

We investigate how a byte's contents vary and start to make use of the BBC Micro's built-in assembler.

71 Adventures

The Mad Hatter provides the beginner to adventures with some helpful ideas to get him started.

83 MicroLink news

A monthly progress report on the growth of the nationwide on-line database for micros.

84 Begin here

We continue to take the novice round in circles using the power of nested FOR ... NEXT loops.

91 Master Class

More on making the most of the Master: All about the ADFS, the Editor and the real time clock.

116 Body building

How to make trackballs and mice compatible with the versatile AMX software.

121 Micromail

The part of the magazine you write yourselves – your news, views, brainwaves and moans.

FEATURES

30 ROM survey

This comprehensive survey shows what's currently available on ROM for your BBC Micro.

96 Dual catalog

We show you how to get 56 files on one disc surface using the Acorn Disc Filing System.

101 Viewgen

Here's a versatile printer driver generator for View, plus full details on how it works.

Contents

GAME

20 **Royal Wedding**

Fond of sliding block puzzles or not, you'll enjoy this entertaining teaser. And it's designed to celebrate the most exciting royal event of the year.

REVIEWS

45 **ROM roundup**

The latest tape-to-disc ROM from Vine Micros and Crash Barrier's Meta Assembler are tested.

67 **Software scene**

From Bruce Lee to Jack Attack, Tennis to Moon Cresta, we try out some of the latest software.

77 **Propak**

We take a look at a disc-based assembly language development package from Dataview Wordcraft.

88 **Hardware scene**

Watford Electronic's latest communications package, Le Modem, is given a thorough evaluation.

BUSINESS MICRO USER

3 **Data protection**

How the Data Protection Act could affect BBC Micro users, plus advice on what a minimum micro system for businesses should consist of, and where best to buy your hardware and software.

10 **Application**

How the BBC Micro has come to the aid of a one-man marketing and promotions business.

13 **Spreadsheets**

More on entering formulae: Advice for beginners on creating a simple spreadsheet.

Wanted: educational writers

Here at Micro User, we're planning to increase our coverage of the education scene. So if you're a teacher or concerned parent with ideas for articles on learning with the aid of the BBC Micro, we want to hear from you. Write to Mike Bibby.

MAIL ORDER OFFERS

50% OFF!

How's this to give you peace of mind? We've done a deal that lets you insure your complete BBC Micro system – *for HALF the normal price.*

Turn to Page 142

50% OFF!

Getting started in
BBC Basic
on the BBC Micro & Electron

Here's your chance to buy one of the most acclaimed books on programming the BBC Micro – *for HALF the normal price!*

Turn to Page 142

PLUS

- Back issues
- Binders
- Body Building kits
- Dust covers
- Educational Specials
- Software

All on the order form on Page 143

Disc Interfaces

Solidisk offers well designed Disc Interfaces enabling your computer to use floppy disc drives. If you feel you would have any difficulty in installing it and/or adding disc drives, you can contact one of our 90+ Local Experts who will install it for you free of charge.

The 1770 Disc Interface

The Solidisk 1770 Double Density Disc Interface has only four components and can easily be fitted even by a novice. The 1770 Disc Interface is supplied with Solidisk 2.2 DFS ROM.

The Solidisk 1770+8271 Disc Interface

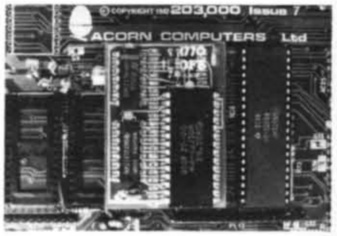
If you already have a 8271 Disc Interface, then the Solidisk 1770+8271 Interface will give you the best of both worlds. You can select either the 8271 or the 1770 at a flick of a switch. The 1770+8271 Interface is supplied with the Solidisk DFS+ADFS ROM set. This is available in two 16K or one 32K ROM.

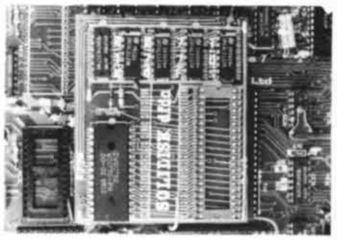
Features built into ROM	**DFS 2.2**	**ADFS**
Disc formatter	yes	yes
Disc verifier	yes	yes
Memory editor	yes	yes
Disc sector editor	yes	yes
Disc copier	yes	yes
Recover & Restore	yes	yes
Read track & Write track	yes	yes
Run 8271 floppy disc controller	yes	no
Osword 7F emulator for 1770	yes	yes
Tape to disc	yes	yes
Download	yes	yes
DFS files to ADFS	no	yes
ADFS files to DFS	no	yes
40/80 switching for 80-track drives	yes	only in DFS
Solidisk Winchester	no	yes
6502, Z80 and 32016 compatible	yes	yes
Read & Write IBM-PC DOS discs	yes	yes

Both the DFS and ADFS have every facility that you would expect. They can run most protected software, such as Elite, Castle Quest, Island Logic's Music System etc. Other features include read after write, and the option of double density operation (with the 1770 chip) giving 60% extra storage capacity. Their compatibility with all Acorn Second Processors (6502, Z80 and 32016) and Econet File Server (Level 2), and their capability of reading from and writing to IBM-PC DOS diskettes (with the 1770 chip) reflect the broad range of applications supported. Both 1770 and 1770+8271 Disc Interfaces are compatible with Acorn 1770 DNFS and ADFS ROMs.

Prices, inclusive of VAT

2.0 DFS ROM and manual	£10.00
ADFS+DFS ROM set and manual	£20.00
Upgrade from 2.0 DFS to ADFS	£10.00
1770 Disc Interface, 2.0 DFS ROM and manual	£45.00
1770 Disc Interface, ADFS, DFS ROMs and manual	£55.00
1770+8271 Disc Interface, 2.0 DFS ROM and manual	£50.00
1770+8271 Disc Interface, ADFS, DFS ROMs and manual	£60.00





The DFS and ADFS ROMs can be used to enhance both standard Acorn 8271 or 1770 Disc Interfaces, on the BBC Model B or the B Plus.

Solidisk Technology Ltd 17 Sweyne Avenue, Southend SS2 6JQ

SOLIDISK MEMORY UPGRADES

Solidisk memory upgrades for the BBC Model B offer excellent value for money. Their designs stand our for compatibility, speed, versatility and computing power. They use the latest component technology to achieve the lowest possible power consumption and size at low cost.

External ROM Cartridge

This comprises an adaptor which plugs into any ROM socket, and a blank cartridge which will accept one or two ROMs. These may be of 16K, 32K or 64K, depending on the capacity of the ROM socket holding the adaptor. This system is particularly useful for seldomly used ROMs, which are well protected by the cartridges. They can be installed and removed repeatedly without any risk to the ROMs and are compatible with Acorn cartridges.

Fourmeg CPU and ROM Expansion

The Fourmeg board plugs into the 6502 Processor socket, and two additional connections are made by sprung clips. It also provides one 64K and three 32K additional ROM sockets.

By adding faster memory and a 4MHz Processor, this board enables the BBC to run most programs in half the time. The new Processor is equivalent to that used on the Acorn TURBO board. It will run most Master software such as the new BASIC 4 and at twice the speed.
A switch selects between normal (2MHz) and fast (4MHz) speed. The higher speed is available to all ROMs and RAM installed in the Fourmeg board. The rest of the machine is unaffected.

Fourmeg Board with 32K RAM

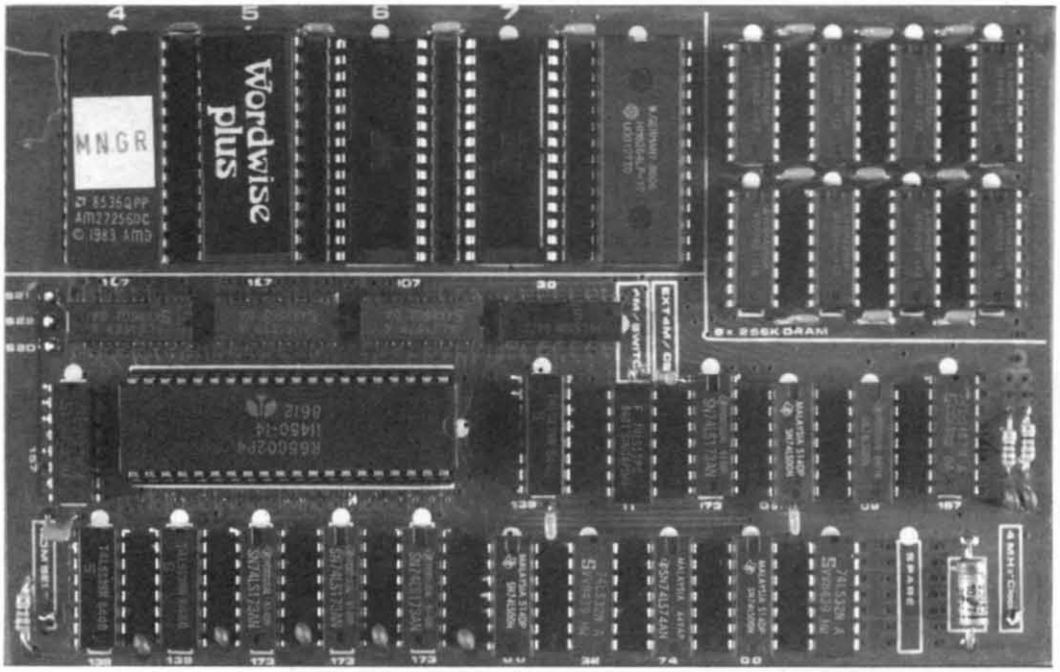
This comprises a Fourmeg board with 32K RAM and a 16K MANAGER ROM. This extra RAM gives Shadow RAM and Sideways RAM capability. Shadow RAM supports the screen in any mode, leaving all the machine RAM free. Sideways RAM can contain the images of two Sideways ROMs or used as RAMDISK or printer buffer. Shadow and Sideways RAM, and the four additional ROM sockets can be switched to the fast 4MHz speed.

32K, 64K and 128K Sideways RAMS

These are the most popular add-ons for the BBC Model B. You can start with 32K and upgrade later to 64K, 128K (and even 256K). The 64K and 128K RAM boards have two 32K additional ROM sockets.

Solidisk Sideways RAM boards are compatible with most add-ons except ROM boards — which they replace. Sideways RAM can run almost all software that is normally available in ROM. Solidisk has a large library of application programs. These include Word-processor, Spelling Checker, Database, Spreadsheet, Extended Basic, Sprites, Ramdisc, Printed Buffer, Machine Code Monitor etc. and more than 70 computer games especially written for Sideways RAM. The programs are available in three packs, each of 5 discs, in 40 or 80-track formats. Pack 1 is included with all Sideways RAM board. Packs 2 and 3 cost £10.00 each (£1.00 p&p). Pack 3 consists entirely of games and game design tools.

The Fourmeg 256



The memory limit on the BBC Micro can now definitely be a thing of the past. The new Solidisk Fourmeg 256 board offers all you could wish for.
It has 256K of extra RAM, a superfast 4MHz processor, sophisticated memory management, sockets for high capacity ROMs and 48K of software in ROM.

All this is built into a board only a tenth as large as the BBC computer, yet containing even more devices.

It is compatible with most hardware add-ons — except Sideways ROM expansion, which it replaces.

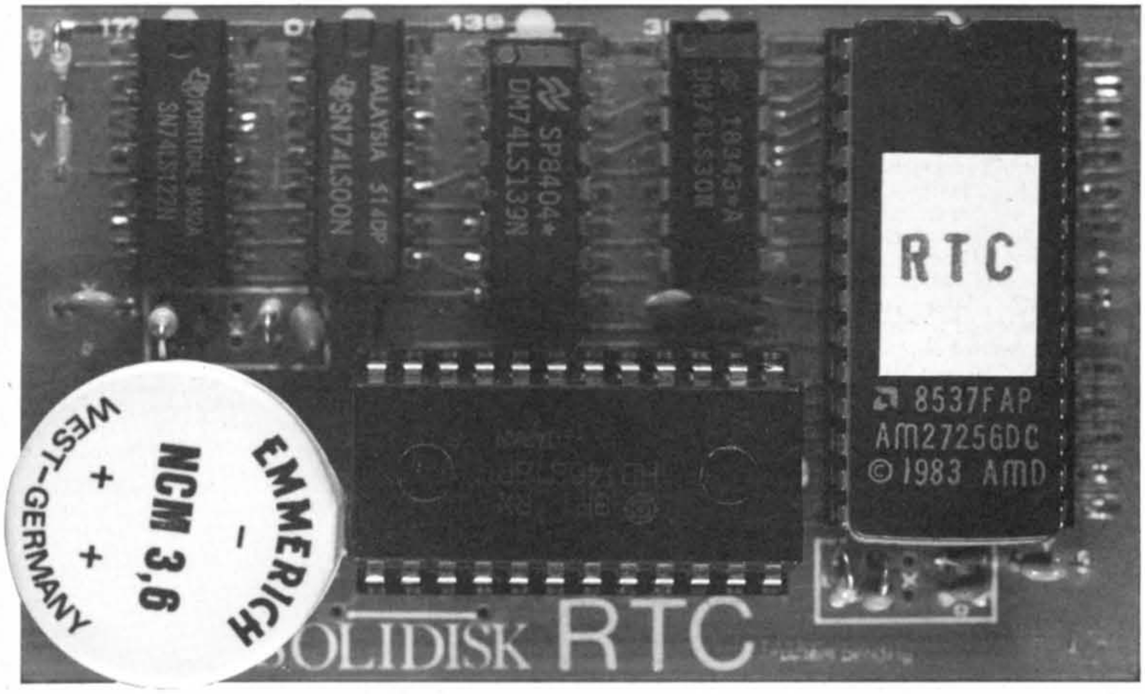
Fitting it is easy. You remove the existing processor from its socket and plug the new board in its place, push on three colour-coded wires, clip on two mini-hooks and it's ready.

Switch on the computer and you will immediately see the difference.

The message "Solidisk 256K expansion (4MHz)" announces the new memory size and speed.
A switch at the back lets you select between the old (2MHz) and the new (4MHz) speed.
The BBC Micro at 4MHz easily surpasses the new MASTER 128K on benchmarks.
For example, it runs the benchmark using Basic 4 in only half the time taken on the MASTER 128K.
If you have too many ROMs to plug in at once, the Fourmeg 256 offers TWO ways out. First, it includes additional high capacity (and fast) ROM sockets. Moreover, two or four normal ROM images can be stored in one high capacity ROM chip (by "Vertical Stacking") — so more can be made immediately available at your fingertips.
★HELP shows only up to 16 ROMs or ROM images but ★ROMS will show them all — up to 64. The ROMs with lower numbers (0-15) are directly accessible, as usual. The others must be copied into number 15 — with ★SELECT — before being used.
Secondly, ROM images can be stored on discs and loaded into any one of the eight Sideways RAM banks available.
If you need more room in "languages" such as VIEW or BASIC, you may use any of the eight SHADOW RAM banks. No user memory is then lost to the screen, whatever the screen mode (while machine coded programs can access RAM right up to &FC00!).
Two frequent uses of the extra memory are as a RAMDISK or a printer buffer.
Star commands in the ROM can turn the extra RAM into a silicon DISK of 200K, compatible with both the Solidisk DFS and ADFS formats. The RAMDISK is at least 10 times faster than physical disc drives as it has no moving parts. The advantages are evident in applications such as spelling checkers, databases and backing up and copying files with a single floppy drive. The printer buffer saves you time, it lets you use the computer while feeding your printer in the background.
In addition, the MANAGER ROM offers over 30 star command utilities to save time and effort using the computer.
To complement such a powerful product, Solidisk has arranged with Computer Concepts to bundle the famous WORDWISE PLUS wordprocessor ROM and manuals. This excellent product, worth £45.00 on its own, became the best selling wordprocessor for the BBC computer last year.
All in all, the Solidisk Fourmeg 256 represents the ultimate in memory upgrades, offering an unmatched combination of speed, power and built-in facilities, while still having room for even further expansion. It also offers an upgrade step for owners of Solidisk Sideways RAM, who can trade in their present boards for the excellent Fourmeg 256.

Solidisk Technology Ltd 17 Sweyne Avenue, Southend SS2 6JQ

The STL RTC



The STL RTC (Solidisk Real Time Clock) is easy to fit: plug it into any ROM socket on the BBC Micro — and that's it. There are no wires to worry about and it's fully compatible with all BBC add-ons.

Switch on the computer and it shows itself as "STL Clock & Desk".

The hardware is an ingenious electronic circuit, employing the same "clock" chip as on the Acorn MASTER Series. It has the same time and date and many of the auto "CONFIGURE" features.

★CLOCK will show the time continuously in the top right corner of the screen.

★NOCLOCK turns it off

It will respond to ★TIME, ★FX141 and ★FX142, and Osword &E and &F. If you have BASIC 4, it will also respond to TIME$="date, time". Otherwise, you may use ★SETTIME instead.

Interesting results can be obtained even with simple programming:

```
10 REPEAT : UNTIL INSTR(TIME$,"07:30") ;
PROCwake—me—up.
```

It will also set options for screen mode, BOOT, TUBE, keyboard repeat rate, sound level, disc speed, MODEM protocol, UNPLUG ROMs etc. on power up. ★INSERT will cancel the effect of ★UNPLUG.

★ROMS shows the names of all the ROMs in the machine.

★CONFIGURE issued on its own will list all options available.

If used with any of the options, it sets the machine accordingly.

★STATUS displays the current options.

The STL RTC also provides a desktop — with accessories — that you can use with an AMX MOUSE or a MARCONI TRACKER BALL. This is the fashionable "user interface" that everyone is talking about. With ★DESK, you can use the mouse to perform most usual disc operations — format diskettes, show disc directories, copy files, and run programs etc. It is compatible with both DFS and ADFS.

The accessories — a calculator and an appointment diary — may be "popped down" from the top of the screen, over any application program.

At only £29.00 inclusive of VAT, the Solidisk Real Time Clock is without doubt a fantastic purchase. It will add enjoyment and convenience to the everyday use of your BBC micro.

80-Column Colour ROM?

No, this is not an April fool, it's a MAJOR enhancement to all Model B's, you can now have AS MANY AS YOU LIKE, 80 column — IN COLOUR — screens, with blinking, underlining and reverse!

Two new colour boards, STL Colour 1 "ROM" and STL Colour 2 "ROM" can enhance considerably the display capabilities of all Model B Micros. Both of them appear as 16K Sideways ROMs (which they contain) to the computer. Each of them contain all intelligence, ROM, RAM and logic capable of driving a colour display unit in both 40 and 80 column, in colour. Both have external "SYNC" input for "GENLOCK" use. For example, one BBC Micro can use 8 STL Colour "ROMs" to interface with 8 different users. One application is low cost public Multi-Terminal Videotext system, STL Colour "ROMs" can be used together with STL Keyboard "ROMs" to build complete "smart" terminals. You may use it just to add "Mode 8" to your BBC Micro and at the same time replace the ordinary "SHADOW RAM". The Colour "ROM" does not use the BBC RAM, leaving you with HIMEM at &8000.

The STL Colour 1 "ROM" has 16K of private Display RAM while the STL Colour 2 "ROM" has 128K. Using compression techniques (like mode 7), an 80 column × 25 row screen can occupy as little as 2-3K of RAM against 16K in BBC mode 3, this increases considerably writing speed to the screen while offering attractive colour, blinking and underlining features.

The Colour 1 "ROM" can produce 40 column in 8 colours (similar to Mode 7 Teletext) or 80 column in 4 colours, with flashing, underlining and reverse. It also has 1024 semi-graphic characters.

The Colour 2 "ROM" can produce 40 column screens in 32 colours, 80 column screens in 16 colours and colour graphics.

The software in ROM will make the new screen completely transparent to the user, in BASIC and in machine code, except that "poking" directly to the screen is not allowed.

Prices:

STL Colour 1 "ROM", from £40.00 inc. VAT.
STL Colour 2 "ROM", from £150 inc. VAT.

Availability:

Delivery of the STL Colour 1 "ROM" is expected at the beginning of July, the Colour 2 version will be on sale at the Acorn User Show.

You can ring (or fill in the coupon below) for a colour leaflet or, if you can't wait, place an order right now with us, you will have 15 days to examine the products and decide whether to keep them or send them back. You may also rent them, with colour monitors for exhibitions, conferences etc . . .

Solidisk local experts

Soidisk has a nationwide network of more 90 local experts and a growing number of experts overseas. They do not usually sell our equipment but can generally fit it free of charge. Please ring Solidisk Sales office. If you wish to call at our office for a fitting however, it is necessary to make an appointment.

Telephone Southend (0702) 354674 (16 lines)

ORDER BY MAIL: Please complete the coupon opposite (or a copy) and send it to:

Prices, inclusive of VAT:

RAM/ROM expansion

Qty		Price	P&P
....	External ROM cartridge adaptor	15.00	1.00
....	Basic Fourmeg Board	30.00	1.00
....	Fourmeg Board with 32K RAM	69.00	1.00
....	Sideways RAM 32K with software pack 1	50.00	1.00
....	Sideways RAM 64K with software pack 1	80.00	1.00
....	Sideways RAM 128K with software pack 1	125.00	1.00
....	256K Board with WW+ and Manager ROM	175.00	1.00
....	Real Time Clock and SOLIDESK ROM	29.00	1.00

Disc Upgrade

Qty		Price	P&P
....	1770 Upgrade with 2.2 DFS ROM	45.00	1.00
....	1770 + 8271 Upgrade 2.1 DFS ROM	60.00	1.00
....	ADFS + DFS ROM set	20.00	1.00
....	Upgrade from DFS to ADFS + DFS	10.00	1.00
....	Solidisk 80 track double sided drive	109.00	3.00
....	Dual Drives, CPU and Keyboard case	230.00	6.00
....	CPU and Keyboard case alone	30.00	6.00
....	EFS for the Electron	59.00	1.00

Wordprocessor Package

Qty		Price	P&P
....	Wordprocessor for the B+ or Master	309.35	10.00
....	Wordprocessor with 1770 DFS & 2 drives	458.85	10.00

Winchesters

Qty		Price	P&P
....	10 MB 5¼in. Beeb powered	499.00	10.00
....	10 MB 5¼in. mains powered	569.00	10.00
....	20 Mb 5¼in. Beeb powered	661.25	10.00
....	20 Mb 5¼in. mains powered	747.50	10.00
....	20 Mb 3½in. Beeb powered	720.00	10.00
....	40 Mb 3½in. mains powered	1148.85	10.00

Modems

Qty		Price	P&P
....	Linemaster ROM and manual	10.00	1.00
....	Telemod 1 MODEM (BABT approved) with Linemaster ROM	50.00	3.00
....	Other MODEMS	P.O.A.	—

Datalife Diskettes

Qty		Price	P&P
....	MD525 (SS/DD) box of 10	16.00	1.00
....	MD557 (DS/QD) box of 10	25.00	1.00

EPROMS

Qty		Price	P&P
....	2764-25 25pcs. (to clear)	25.00	1.00
....	27128-25 (or better) pack of 5	25.00	1.00
....	27256-25 (or better) pack of 3	25.00	1.00
....	UVIPROM Eprom Programmer	19.00	1.00
....	UVIPROM32 for our 27256's	21.00	1.00
....	UVIPAC Eprom eraser	20.00	1.00
....	Solidisk Toolkit ROM	10.00	1.00
	Total		

Name: ....

Address: ....

....

....

VISA

ACCESS

We reserve the right to change prices and specifications without notice. If you wish to call at our office, please telephone for an appointment.

Solidisk Technology Ltd 17 Sweyne Avenue, Southend SS2 6JQ

THE MICRO USER

July 1986

NEWS

Acorn can't make enough Masters

ACORN has ramped up production of the Master 128 to 50,000 machines a month – yet it still cannot meet demand.

A survey conducted by *The Micro User* reveals that the company could currently be selling 100,000 machines every four weeks.

Typical of the dealers contacted was Bill Wood, managing director of Comp Shop, who said he could sell double his quota.

"We are suffering from acute product starvation", he said. "At the moment we have a waiting list of 150 people and the list is growing day by day".

A company source told *The Micro User* that production has in fact already been increased twice since the launch.

It was first raised 10 per cent at the end of January due to the initial response and since then by a further 10 per cent.

"We are restricted by the terms of our contract with AB Electronics as to the percentage by which we can increase production", admitted the Acorn informant, "otherwise we would have ramped up even more to try and clear the order book.

"You can be certain that we are just as frustrated about the situation as are both the dealers and the prospective customers".

However not all dealers are convinced that Acorn is pulling out all possible stops to meet the demand.

"We see this as them being over-cautious, based on the problems that brought them almost to their knees last year", said one.

"They are frightened to death of being caught in that same position with a sudden fall in demand and huge stocks.

"But we are left losing sales in droves. And people will only wait so long before deciding to spend their money on other machines.

"Once again Acorn have found a winner without being able to capitalise on it to the full".

Insure your BBC Micro

A UNIQUE personal computer insurance package which for the first time offers breakdown cover is now available to subscribers to *The Micro User*.

Underwritten by the giant Cornhill Insurance group, the scheme also provides protection against theft, accidental loss and damage at savings of up to 50 per cent, making it the cheapest in the country.

While the theft clause only applies to micros that are stolen from lockable buildings, the accidental loss and damage cover is for anywhere in the UK – even while the computer is in transit.

Negotiated by Database Publications on behalf of its readers with leading brokers Mason and Mason of Wilmslow, the breakdown section covers call out, labour and materials charges for all micros not under warranty.

As with all current policies, different rates apply to urban and metropolitan areas, the latter being judged high risk areas for theft. Cover for a £500 system – micro and peripherals – would cost in the region of £16 a year.

Businessmen who subscribe to *The Micro User* will also have the opportunity to join a company scheme which provides additional cover.

"The market has been crying out for a policy of this kind – particularly involving breakdown – for years", says Derek Meakin, head of Database. "We are just pleased that we are able to offer it first to subscribers to *The Micro User*".

For further details see Page 142.

RADIATION CHECK ON YOUR MICRO

A DO-it-yourself home radiation detector based on the BBC Micro is to be made available in the UK in the wake of the Chernobyl disaster.

The brainchild of Mike Cook, technical editor of *The Micro User,* it will provide an accurate reading of deadly radioactive fall-out at a price the man on the street can afford.

"A lot of people have expressed concern since the Russian accident over the degree of accuracy of reports on the potential dangers to themselves", says Mike Cook.

"With the detector they'll be able to know the true situation – and hopefully put their minds at rest".

Such was the interest generated by the prototype, demonstrated for the first time at the Electron and BBC Micro User Show, that it attracted national media coverage.

However the detector will not go on public sale. Instead it will be exclusive to readers of *The Micro User*, appearing as part of the the Beeb Body Building Course in next month's issue.

Although the price has yet to be decided, it will be considerably cheaper than the £500 needed for a comparable geiger counter.

The home radiation detector in fact incorporates a geiger-muller tube as found in a geiger counter.

But it replaces the conventional electronic counters and scalers by linking up to a BBC Micro via an interface. Then, with suitable software, the readings appear on the monitor.

Yet it remains the role of the geiger-muller tube to detect radioactive disintegration.

It achieves this by the gas it contains reacting to both Beta and Gamma rays – the type of highly-dangerous fall-out which can penetrate buildings.

"By using a BBC Micro you get a more accuracy than you do with more conventional radiation measuring equipment", says Mike Cook.

Fascinated

A lecturer in physics at Manchester Polytechnic, Mike Cook became fascinated by nuclear radiation when taking atomic physics as part of his degree course.

This resulted in him "playing around" with radiation level detectors for blast furnaces.

"In fact I've had a personal home detector lying around in very primitive form for years", he said.

"It was the intense interest of late in the subject that persuaded me to dust it off and redesign it for our readers".

FREE BINDER
Link your BBC Micro to a geiger counter

Mike Cook, left, explains his home radioactive fall-out detector at the Electron and BBC Micro User Show

MICRO USER HELPS SPEED MEDICAL BREAKTHROUGH

THE Micro User has come to the aid of Christopher Crowhurst the 16-year-old whizz kid whose programming skills have achieved a breakthrough in medical software that could save many lives.

Plymouth schoolboy Christopher recently delighted researchers at the world famous Johns Hopkins teaching hospital in America – and made headlines around the world – by solving a problem that had baffled expert computer programmers for years.

Working on his BBC Micro Christopher pinpointed errors in a program designed to read data from blood pressure tests on the eyes which can predict the chances of heart attacks or strokes.

As a result software can now be produced that will eventually put early detection of potential cardiac victims within reach of every doctor with a micro.

Hampered

But work on the project has been hampered by lack of technology to test Christopher's new program here and in America.

Although the software is known to do its job perfectly only slow running versions of it have been possible. This affects its value because data doesn't change quickly enough to give the sort of readings doctors need for accurate diagnosis.

What was needed by Christopher and the scientists at the Johns Hopkins medical research team was additional power for their BBC Micros so that the program wouldn't hang and stop when it was being run.

After a plea for help from Christopher's father *The Micro User* came to the rescue in the shape of technical editor Mike Cook's long-running body building course.

A prototype circuit board, and diagrams showing how it should be implemented, were rushed to Christopher so that he could build the necessary add-ons.

Christopher will be in the US this month on a bio-medical research fellowship at Johns Hopkins in Baltimore putting the finishing touches to his program and adapting it for other micros.

No delays

Before leaving he said: "I could have designed and built a circuit board of my own but it would have taken a long time, and if I'd made the slightest error I wouldn't have known how to find and correct it.

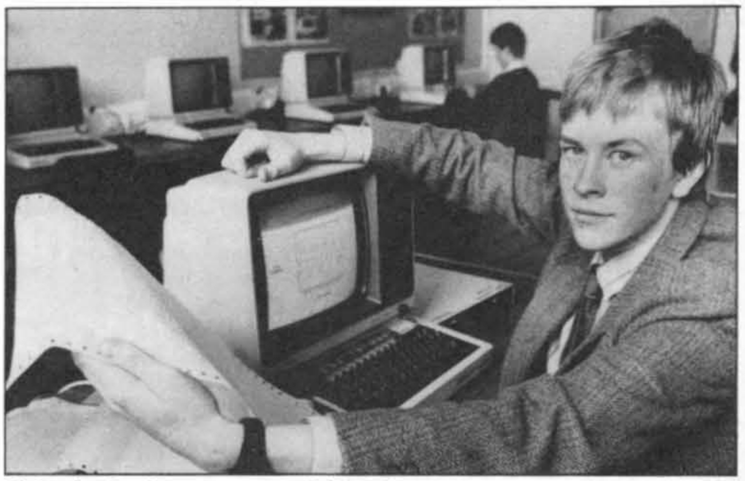
"Thanks to *The Micro User* I now have the extra technology I need for myself and the doctors at Johns Hopkins, so there should be no delays in completing the job.

"From now on I can send programs to America and know that they will work properly as I have been able to test them here beforehand, and also know the people over there can run the software effectively on their BBC Micro".

The Americans are so pleased with Christopher's expertise as a programmer they want him to stay over there as long as he likes, but he'll be returning to England at the end of the month.

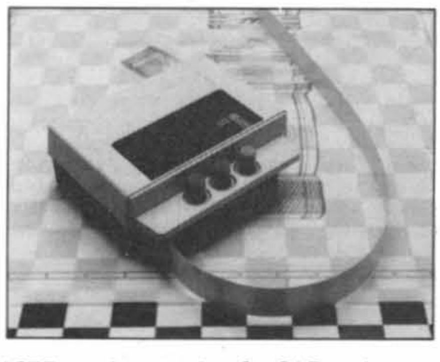
He explained: "I'm more interested in rock climbing and sailing than computers and I'll be going to Scandinavia for the tall ships race in August with the Sail Training Association.

"But I'm also looking forward to going to America. It's the first time I've been abroad on my own, and it's nice to think that I may have helped the doctors over there to perfect a program that could save lives".



Christopher Crowhurst . . . on research fellowship

More plotters



BASED on its award winning GR1500 plotter, the Penman II range for the BBC Micro – three new models for professional CAD, business and educational markets – has been launched by Penman Products.

The new designs are capable of accurate plotting on drafting film up to A0 size, and the provision of an RS232 port means they can be used as CAD workstation plotters.

Penman II can be used with most software packages as a direct replacement for the HP7475A plotter or the HP7585 A1 plotter, and is suitable for CAD packages such as AutoCAD and RoboCAD PC.

It operates in one of two modes chosen for either plain paper or partially transparent drafting media such as polyester film or popular grades of tracing paper.

Penman IIB for A3 sized plots costs £395, Penman IID for A1 sized plots is £595, and Penman IIE for A0 sized plots costs £695.

Owners of Penman GR1500 models can convert their plotters to Penman II by returning them direct to Penman Products.

PRINTER SWITCHES

TWO printer switch boxes for the BBC Micro have been brought out by C.F. Terrell.

The PS1 allows two BBC Micros to be connected to one printer and costs £35. The PS2 serves two printers and costs £38.

Both models come with cables, connectors and push-button changeover switch.

TOLKIEN TAKE-OFF

FOLLOWING its successful Bored of the Rings, CRL has announced another Tolkien take-off from Delta 4, The Boggit.

Split into three parts, the game allows the player to move freely between each part – data concerning his progress being transferred between the programs to ensure continuity.

The game has split screen graphics and more than 100 locations to explore. Price: £7.95.

Four records go at the big Show

The Show ... Mecca for micro men and women

WITHIN an hour of the doors being opened for the Spring Electron & BBC Micro User Show the scene was set to eventually break not one but four records.

At that time the turnstiles were temporarily closed because of the volume of people flooding into the New Horticultural Hall.

It was a situation that was to be repeated on several occasions during the three day event which attracted more than 16,000 visitors, an all-time high.

The first day alone saw more than 5,000 enthusiasts converge on the hall – the largest ever number during a working day.

Yet another record fell when it was assessed that more than £1,200,000 worth of business had been achieved at the show, beating the previous best by £200,000.

Nor were the smiles confined to the faces of exhibitors. A survey of stands showed more than 500 special offers on display – close to 100 in excess of the former record.

"It was just fantastic", reported John Huddlestone of Advanced Computer Products. "We took more on the first morning than for the whole of any of the previous shows.

"The only trouble is that having exhibited at the last few shows, I'm now running out of superlatives to describe them".

And he said that interest in the new Master was phenominal.

Although ACP was only able to demonstrate the company's new Advanced 1770 DFS for the Master at the show – "the documentation wasn't ready" – it still attracted several hundred advance orders at £34.50.

"We were particularly pleased about this", said John Huddlestone, "for we believe this is the first add-on to take full advantage of the Master's facilities".

Yet another package for the Master which attracted maximum crowd attention was Pagemaker from Advanced Memory Systems of Warrington.

Already a best seller on the BBC Micro, it combines a low cost typesetter, graphics and word processor on two ROMs and two discs.

Priced at £49.95, it

Turn to Page 15

Key to communication for the handicapped

NORTH Wales educational software company Clwyd Technics had chalked up a string of heartwarming success stories with a product for handicapped BBC Micro users.

Its Keymaster keyboard emulator enables even severely disabled people to control any commercial software with the help of simple aids such as a one or two switch system, joystick or blow-switch.

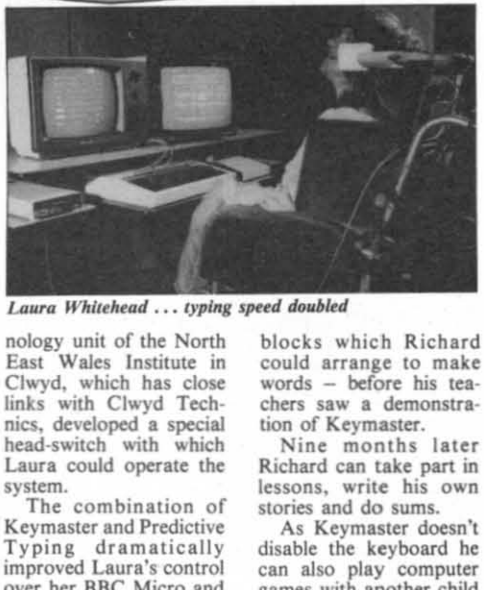
And if the user has reached an advanced educational standard where faster typing is required, Keymaster Predictive Typing speeds up keyboard manipulation.

A display at the bottom of the screen shows the five most likely letters to be used next, and selection is made by using the cursor.

If the required letter is not in the first five shown the next most likely five letters are displayed.

Keymaster and Keymaster Predictive Typing have already made a big difference to the lives of several severely handicapped youngsters.

Laura Whitehead, a 21-year-old living in Blackpool, has only one movement – she can move her head from side to side – but she has successfully completed an O level sociology course using Keymaster.



Laura Whitehead ... typing speed doubled

The special needs technology unit of the North East Wales Institute in Clwyd, which has close links with Clwyd Technics, developed a special head-switch with which Laura could operate the system.

The combination of Keymaster and Predictive Typing dramatically improved Laura's control over her BBC Micro and her typing speed was doubled.

Another pupil to benefit from Keymaster is Richard, a 12 years old, an anethoid spastic with no power of speech whose only voluntary movement is an ability to move his left arm 18 inches from side to side.

With the educational level of a seven-year-old, he was being held back by his difficulty in communicating even though he was of average intelligence.

Various teaching aids have been tried without success – the most useful being a system of lettered blocks which Richard could arrange to make words – before his teachers saw a demonstration of Keymaster.

Nine months later Richard can take part in lessons, write his own stories and do sums.

As Keymaster doesn't disable the keyboard he can also play computer games with another child who is able to use the keys while Richard controls his end with two lever switches.

Pleased with Richard's success, the school bought a second Keymaster for use by another athenoid spastic called David.

David, aged five, is not as severely handicapped as Richard and with therapy will eventually be able to speak. His teachers expect that with the help of Keymaster from such an early age he will be able to keep up with other children at the school.

Now 64k in all modes

A NEW add-on board which solves the 32k user RAM problem was unveiled at the Electron and BBC Micro User Show.

Developed by Watford Electronics, it provides 58k of RAM in all modes while in Basic II or View 2.1.

Breaking away from his packed exhibition stand managing director Nazir Jessa told *The Micro User:* "We have achieved what others thought impossible and have given people what they want – 64k in all modes".

The board is currently subject to patent application.

Watford provided yet another answer at the show when it demonstrated its new high capacity Winchester disc.

A solution to floppy disc space problems, it was billed by Watford "as the optimum balance between reliability and cost".

The drive is intended for use with ADFS and is suitable for connection to the standard BBC B, the B+ and the Master.

Watford has as yet to announce the price but it is believed to be in the region of £700.

MIRACLE TECHNOLOGY
MODEM WS4000
V2123
ON
OL
CD
SD
RD
AA

Within Your Reach

£149.95* for a Hayes compatible, autodial, autoanswer with speed seeking smart modem from one of the UK's best-known modem manufacturers — that really brings the world of data communications within your reach!

If that wasn't enough, the new WS4000 is also fully intelligent and speed buffered. And you can add your choice of optional extras now or later, taking it right up to full V22 or even the 2400 bps V22 bis standard.

For only £149.95* you can reach out to Prestel, Telecom Gold, Micronet, Microlink and the world's databases, bulletin boards and telex links through your own telephone line. User-user file transfer too.

WS4000 is made to the same high quality as all our products. The price breakthrough is a direct result of our massive component buying power through high volume sales to business, home, educational and Government users throughout the world.

If £149.95* is within your reach — then so is the world.

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them.

*Price excludes VAT. Total delivered price, UK mainland, is £178.19. Prestel, Telecom Gold, Micronet and Microlink are registered trade marks of those companies. Access & Visa cards accepted.

MIRACLE TECHNOLOGY

MIRACLE TECHNOLOGY (UK) LTD ST PETERS STREET IPSWICH IP1 1XB ENGLAND
☎ (0473) 216141 6 LINES TELECOM GOLD 79: KEY 001 (Dealerlink 72: DTB 10135)
Tx 946240 CWEASY G 19002985 PRESTEL MAILBOX 919992265

New graphics program for education

IT took a three-man team three and a half years to write and develop a new graphics package, Image, to aid in art and design on school BBC Micros.

At its launch at Homerton College, Cambridge, by the Cambridge University Press, 120 educational advisers, inspectors, teachers, art college lecturers as well as representatives of computer manufacturers, industry and commerce saw demonstrations of Image by local schoolchildren.

The program team comprised Fred Daly, director of Information Technology, art lecturer David Spence and programmer Chris Forecast.

More than 130 teachers as well as local education advisers helped with the development and finally, for one year, the program was tested in 25 schools in the Essex, Cambridge and East Anglia areas.

Guest speaker was Professor Brian Allison, Dean of the Faculty of Education, Humanities and Social Science at Leicester Polytechnic.

He said children spent an alarming amount of time watching television and videos. He called the computer games arcades the playgrounds that introduce children to some of the most advanced forms of computer technology.

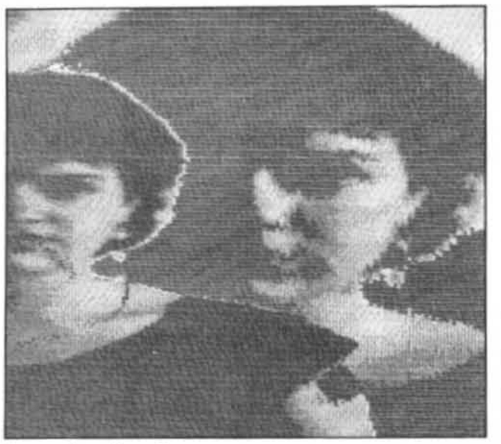
"Paradoxically very little time is spent in art and design programs in schools helping the children to understand and be critical of, in the positive as well as the negative sense, their most frequently encountered visual images", he said.

"The low availability of suitable and accessible software has given little encouragement to the possibilities of the computer as an art medium. It is my belief that Image may change that situation".

Image can be used with keyboard, joystick, mouse or graphics tablet. The image can be modified or changed, and colours can be mixed. Video pictures can be transferred to the computer screen.

Up to 24 separate screen designs can be stored on a second disc in the package, Sketchbook.

The two discs each cost £39.95.



Screen dump from Image

AZIMUTH CHECK

AN azimuth alignment program which will reduce misloads and minimise the risk of bad saves has been released for the BBC Micros by Global Software.

Operation Alignment is said to help keep cassette heads at the optimum 90 degrees.

The package contains an alignment program tape as well as a screwdriver for adjusting the tape heads.

Price: £5.95.

BBCs mean business

MORE than £400,000 has been invested by Twillstar Computers to promote their sales of BBC Micros.

Over the last three years business boomed so much at their 750 sq ft West London shop that the company was forced to move to larger premises. Now two warehouses covering 7,000 sq ft in Southall have been converted into a well-stocked warehouse and adjoining showroom.

The 15 strong staff can now offer full repair facilities and sales advice as well as being able to provide instant stock from the warehouse. Said managing director Sevy Dhesi: "The BBC Micro has certainly brought about increased sales".

ELEGANT ACCENT

BBC Micro users can now produce voices "with a real English accent" with a Phonetic Synthesiser from Loughborough Sound Images.

Dr Geoff Duck, the company's technical director, says: "People think all synthesisers talk like a Dalek or with a transatlantic drawl.

"Britain has long been a leader in speech research and our system builds on this.

"It speaks with a real English accent and has a natural intonation. The user can tailor the sounds to create accents, and even use another language".

The synthesiser can be adapted for voice-over use with games and can be used to help children to improve their reading ability. Price: £347.

From Page 13

lends itself to letters, posters, menus, in fact anything that needs to be created on A4 size paper.

On the modem front Pace was displaying its internal Master modem for the first time, but it wasn't for sale, as it is still awaiting BABT approval.

Meanwhile arch rival Modem House was also apparently offering a similar product, but wasn't prepared to reveal how it is fitted at this stage.

Over on the DataStar stand managing director Barry Krite was doing a roaring trade in Magic Modems, the device which has recently been given BABT blessing.

Computer Concepts almost made it to the show with saleable versions of its revolutionary new word processor Inter-Word, but not quite.

Despite working against the clock to provide the latest in its suite of integrated programs for the BBC Micro, only a few pre-production prototypes made it to the stand.

However, based on Computer Concept's first class reputation, there seemed no shortage of customers eager to put their money down for empty boxes and wait for the chip.

Wandering around the show produced a number of noteworthy items.

Solidisc was showing off its 256k 2/4 mb ROM RAM board with company representatives insisting that all the bugs have now been ironed out.

HCCS was offering a keyboard based music system in various configurations. Its top of the range Echosound ROM package was reduced from £99.95 to £69.95 for the show.

Micro Aid had its new extended payroll package on view for the first time for £57.

Viglen was seen to be taking advantage of the boom in interest for the Master with a version of its BBC Micro replacement case. With the keyboard as a separate unit, it was being sold for £79.

Overbase – a new company – was eagerly promoting its "Thingi" with balloons and stickers all over the place.

This is a simple but effective plastic device using Velcro strips to attach it to a monitor. Incorporated is a clip to hold paper which can then be easily read by anyone using the keyboard.

"We hope to make a million out of it – and thanks to the success of this show, we are well on our way", a company spokesman told *The Micro User*.

SITUATIONS VACANT

COMPUTER WRITERS/ EDITOR

Database Publications are expanding. And we're looking for more full time editorial staff.

The work will involve playing a major role in the running of one or more of our computer magazines.

Successful applicants will be working in all aspects of the editorial process, from the origination of articles to the final production of the magazines.

The people we're looking for will have experience in computing on one of the popular micros such as the BBC Micro or Amstrad. Equally important, successful candidates will have the ability to express their ideas clearly and fluently in writing.

However lack of direct experience in the fields of computing and publishing need not be a bar to applying. What we're looking for is drive, creativity and the ability to learn on the job.

If you have the qualities we require, send your full CV together with an example of your writing to:

The Personnel Manager,
Database Publications,
68 Chester Road,
Hazel Grove,
Stockport SK7 5NY

EPROMS, 8271

(Phone for quantity discounts)

	Ex VAT	Inc VAT
1-9 27128 Hitachi 250nS Eprom	2.57	2.95
10+ 27128 Hitachi 250nS Eprom	2.30	2.65
2764 Hitachi 250nS Eprom	2.00	2.30
27256 Hitachi 250nS Eprom	4.57	5.25
1-9 6264LP-15 8K x 8bit Ram	3.04	3.50
10+ 6264LP-15 8K x 8bit RAM	2.57	2.95
1-9 8271 Floppy Controller	33.19	39.00
10+ 8271 Floppy Controller	32.00	36.80
1-9 Disc CMOS/TTL Chips	4.77	5.49
10+ Disc CMOS/TTL Chips	4.00	4.60
Acorn 8271 DFS Disc Interface	42.61	49.00
Acorn 8271 DNFS Disc Interface	51.30	59.00
1-9 B Plus 64K to 128K Upgrade	26.00	29.90
10+ B Plus 64K to 128K Upgrade	22.00	25.30
Inter-Sheet (Spreadsheet)	40.00	46.00
Inter-Word	44.30	50.95
Basic II Rom for BBC Micro	13.00	14.95
View	40.87	47.00
ViewStore	44.30	50.95
Wordwise Plus Rom – Computer Concepts	39.09	44.95

(Full range of Roms available)

DISC PACK – SPECIAL OFFER

100k Drive & Acorn Disc Interface	£118.00 inc VAT
400k Drive & Acorn Disc Interface	£168.00 inc VAT
Full range of drives by Akhter & Cumana	from £69.00

DISKETTES

DISKETTES .... 15.99 inc VAT

10 in library case. D/S O/D 96tpi. Lifetime warranty

Bulk Pack 200 diskettes .... £199.00 inc VAT

MASTER SERIES

	Exc VAT	Inc VAT
Master ET 128K with ANFS	338.00	388.70
Master 128K Micro	416.52	479.00
Master Turbo Upgrade	103.48	119.00
Master Econet Module	43.47	49.99
Reference Manuals (each)	14.95	14.95

CITIZEN 120D
with BBC cable & paper
£165.00 (143.48+VAT

JUKI 5510
with BBC cable & paper
£219.00 (190.43+VAT)

JUKI 6100
with BBC cable & paper
£285.00 (247.83+VAT)

JUKI 2200
with BBC cable & paper
£269.00 (233.91+VAT)

TAXAN

KP810

with BBC cable & paper
£218.00 (£189.57 + VAT)
(phone to check price)

	Ex VAT	Inc VAT
KP910 17" width printer	328.70	378.00
KP810 Paper roll	3.43	3.95
KP810 Dust Cover	4.00	4.60
KP810 Print ribbon	5.00	5.75
KP810 Printer Control/Dump Rom	13.00	14.95
KP810 View Printer Driver 40/80T	8.65	9.95

LX-80 *(EPSON)*

with BBC cable & paper
£218.50 (£190.00 + VAT)

	Ex VAT	Inc VAT
LX-80 Tractor Unit	18.22	20.95
LX-80 Sheet Feeder	47.83	55.00
LX-80 Dust Cover	4.00	4.60
LX-80 Print Ribbon	3.90	4.49
LX80 Printer Control/Dump Rom	13.00	14.95
LX80 View Printer Driver 40/80T	8.65	9.95

Monitors

	Exc VAT	Inc VAT
Philips CF1114 TV/Monitor	173.04	199.00
Philips BM7502 Green Monitor	68.70	79.00
Philips BM7522 Amber Monitor	72.61	83.50
Taxan KX1201G Green Monitor	88.70	102.00
Taxan KX1203G Amber Monitor	103.48	119.00
Taxan Super Vision 3 Colour Monitor	320.87	369.00
Microvitec 1451MS Medium Colour Monitor	223.48	257.00

Monitors, Printers etc. BBC Cable supplied FOC.

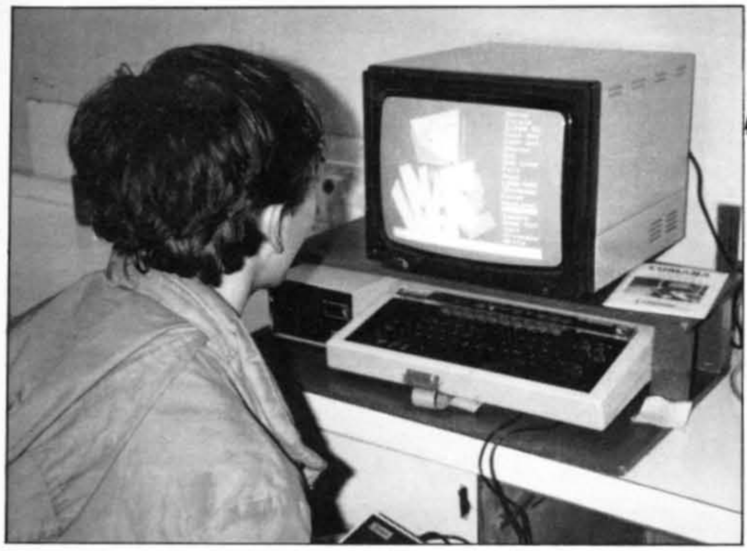
Phone for our best price before placing your order
EDUCATIONAL & GOVERNMENT ORDERS WELCOME
All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
Carriage 92p (80p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

Next day delivery by Securicor

Micro Dept.
128 West Street,
Portchester,
Hants.
PO16 9XE.
Tel: 0705 325354

Mobile micro helping youth



A youth club member at Sheffield works on the BBC Micro brought in by the community mini-bus

PHYSICALLY and mentally handicapped children, youth club members and unemployed young people are being introduced into the computer world by a run-about BBC Micro.

Liz Prior, computer projects supervisor at the Earl Marshall Youth Centre at Sheffield, South Yorkshire, daily runs a mini-bus, with nine other helpers, visiting special clubs for the handicapped and drop-in centres for the jobless.

The project has developed within the centre with the help of youth club leader Gwyneth Harris. She and Liz and two members of the team were delegates to the national conference in London where the application of computers in youth work was debated.

Youth leaders were told by Ed Berman, founder of Inter-Action, an educational charity set up in 1968 as a non-profit making organisation: "Youth clubs could transform themselves into occupational springboards if they used computers in an imaginitive way".

In the Sheffield area, Liz is aiming for just that. "If we can give them the opportunity to have a go with a computer and stimulate their interest, they could go on to evening classes and colleges providing computer training", she said.

Arcade shoot-out type games are discouraged. "We carefully select software and encourage the use of strategy games, adventures and quiz-based programs which require logical skills or participation with others", she continued.

While the BBC Micro is taken about the area youth clubs, priorities are given to organisations which are not funded and special clubs for the disabled or youth clubs which have integrated handicapped people.

Said Liz: "When working with any disabled young people we try to use a touch pad and joysticks to reduce the need for the keyboard and this seems successful.

"Sometimes working in pairs they can provide a good team operating the computer. We also like to encourage sessions just for girls. We feel they can gain more confidence working together without intimidation from the boys".

After the conference the Department of Education and Science announced a £75,000 grant over the next three years to Inter-Action for their youth club community computer projects.

It is subject to them raising matching funds. Already partial backing has been received from the Tudor Trust, Save and Prosper and United Business Systems.

Modems in Schools decision under fire

THE Department of Trade and Industry stands accused of rejecting the principles of free enterprise with its £1 million Modems in Schools scheme, according to a story in the latest issue of the communications magazine *TeleLink*.

It follows the DTI's decision to limit the choice to two modems – the Dacom DSL 2123AD and the Tandata TM512.

Barry Krite, boss of DataStar Systems, the company behind the Magic Modem for the BBC Micro, is so incensed at what he considers to be an arbitrary decision that he has asked his local MP to raise the matter in the House.

"The whole business is nothing short of disgusting", he told *TeleLink*.

"Here we have a Conservative government which constantly advocates the merits of free enterprise when one of their own departments is actually turning its back on it".

Discounts

According to the DTI the reason why the two particular modems were chosen was that the companies offered major discounts on their products. Whereas the usual prices for the models are in the region of £300, it is believed the DTI has paid only £110.

"It would seem they are suggesting that they have got the best deal for the taxpayer", reports Barry Krite.

"But when it is not left to ordinary market forces how will they ever know? The only thing I can guarantee is if that's the price they are paying then they could have got a much better deal from other manufacturers – including ourselves".

PMS 6502 for BBC

A BBC Micro version of the PMS 6502 second processor from Permanent Memory Systems will be launched within the next few weeks, the company has announced. The price is expected to be under £100.

Play your cards right with Sam

Samantha and Martech MD David Martin

BBC Micro owners who play their cards right will be able to see more of busty Samantha Fox, for Martech has signed up the top model for a version of Strip Poker.

Samantha, in digitised pictures, starts off fully clothed, including a coat. Then the card game starts.

David Martin, managing director of Martech, said: "Sam starts to strip should the opponent win a hand. But I can tell you it will need a great poker player to get her to strip fully!"

The program, which also includes Seven Card Stud introducing three international poker players as opponents, costs £14.95.

BBCs could join Navy

ACORN will be competing when tenders are invited by the Royal Navy to supply standard micros for floating classrooms for its junior officers and young sailors.

At present Britain has had to double to 70 per cent the number of sailors in sea-going jobs, cutting the time spent in educational training ashore.

Some warships have a variety of computers, bought from ship's funds, for study and recreation as well as the officially installed computers needed for analysing the performance of weapons.

But the Royal Navy wants a standard machine capable of helping sailors' basic education in mathematics, English and other subjects, as well as professional courses, previously taught ashore.

The idea is, by providing a standard computer, a step-by-step teaching system can be worked out so sailors can learn either computerised operational work or CSE and GCE subjects at their own pace and be able to go back over parts they do not understand.

The Royal Navy at present has 25 submarines, three aircraft carriers, 14 destroyers, four Fleet tender training ships, an ice-patrol vessel, eight survey ships, and a number of frigates, which would all need computers, the larger vessels requiring many additional machines.

An Acorn spokesman said: "We certainly would be interested in submitting a tender to the Royal Navy. We believe the BBC Micro and of course the Master would be ideal with all the educational software back-up which could cater for all sections of study".

SIMULATOR HAS A REAL PILOT

A BRITISH Airways Tristar captain is one of the "crew" behind the first flight simulation program for two linked BBC Micros.

Roger Selby (pictured above) combined his day-to-day flying skills with the expertise of Nick Brown, whose background is in military flight simulation, to come up with Double Phantom from Doctor Soft.

Demonstrated on BBC Television's Micro Live recently, it is claimed to be unique in that it is multi-user, being able to run simultaneously on two machines.

The essential element is the special hardware link supplied with each program. This connects any two BBC Micros which then become separate "aircraft" flying in shared airspace, with each able to see the other outside.

As a result the linked simulators are able to perform spectacular aerobatic displays or take part in combat dogfights.

"From the pilot's point of view, I was able to check the realism of instrument and outside view response", says Roger Selby.

"Meanwhile Nick Brown made sure we traded excess ground clutter for speed and smoothness of motion".

Double Phantom costs £19.95.

New model on way?

ACORN is saying nothing about rumours of a new machine in the pipeline to take on the Amstrad PCW range, which has a virtual monopoly in its section of the market.

Stories circulating at the Electron & BBC Micro User Show had Acorn bringing out a scaled down Master with big Electron style ULA, two 3in disc drives, 64k, green screen and bundled software for around £400.

Comms link boosts Mini Office II

MINI Office II, successor to the 1985 Business Program of the year Mini Office, is reaching an even wider audience than the first version.

The addition of two new modules – label printing and communications – to the original combination of word processor, database, spreadsheet and graphics has given the software even wider appeal.

As well as business users and computer training course operators, educationalists at all levels from college to primary schools are buying the program, as are hospitals and even government departments.

Mini Office II, which is available from all leading multiples like Boots and W.H. Smith, is being used in Health Service administration, to train youngsters in business technology at places like Newport Itec, and in schools for children of British Army personnel.

"Mini Office II is training administrators of the future", says a spokesman for the publishers, Database Software.

"Even primary schools are using it because its excellent graphics make it an attractive teaching tool for the youngest age groups, while at the same time it is sophisticated enough for any businessmen or office administrator".

Mini Office II costs £14.95 on cassette, £16.95 on 5¼in disc and £19.95 on 3in disc.

IT'S MAGIK

LATEST adventure released by Level 9 for the BBC Micro is Price of Magik.

The object is to take over the Red Moon crystal ball and learn spells to control an enemy. It costs £9.95 on cassette.

reflex MAGNETICS

DISKETTES DIRECT BY MAIL FROM THE MANUFACTURER

REFLEX MAGNETICS are a new manufacturer who set out to design and engineer the highest quality and most reliable diskette ever made.

Each REFLEX disk carries a full Lifetime Warranty — and is certified 100% error-free.

REFLEX 5¼" diskettes are available in units of 50, either in 5 FREE modules of the unique interlocking DiskBank Filing System or a FREE LOCKABLE storage box, as shown above. Choose whichever suits your needs.
REFLEX 3½" diskettes are available in units of 30 in a FREE LOCKABLE storage box, as shown above.

Constructed of the highest quality materials available, each diskette is then individually tested to some of the most stringent levels known to industry.

REFLEX are already an established manufacturer and supplier to large corporations and industry. Now, we are making our high quality diskettes available to you by mail.

To order REFLEX diskettes simply fill in the coupon or order by telephone (01) 722 9231 (24 hour answering). Reflex will accept Access, Visa or cheques; official orders from Government or Education departments and Companies are also accepted.

Please despatch today: (FREE DELIVERY)

TYPE OF DISK		PRICE INC. VAT	TOTAL
5¼" SSDD 48 TPI	☐x50 @	£ 57.50 =	....
5¼" DSDD 48 TPI	☐x50 @	£ 63.90 =	....
5¼" SSDD 96 TPI	☐x50 @	£ 71.90 =	....
5¼" DSDD 96 TPI	☐x50 @	£ 78.00 =	....
5¼" HD 1.6 MB	☐x50 @	£126.50 =	....
3½" SSDD 135 TPI	☐x30 @	£ 75.90 =	....
3½" DSDD 135 TPI	☐x30 @	£ 89.70 =	....

TYPE OF FREE BOX
5¼" Modules ☐
5¼" Storage Box ☐
3½" Storage Box ☐

METHOD OF PAYMENT
Access ☐ VISA ☐
Cheque ☐ Official Order ☐

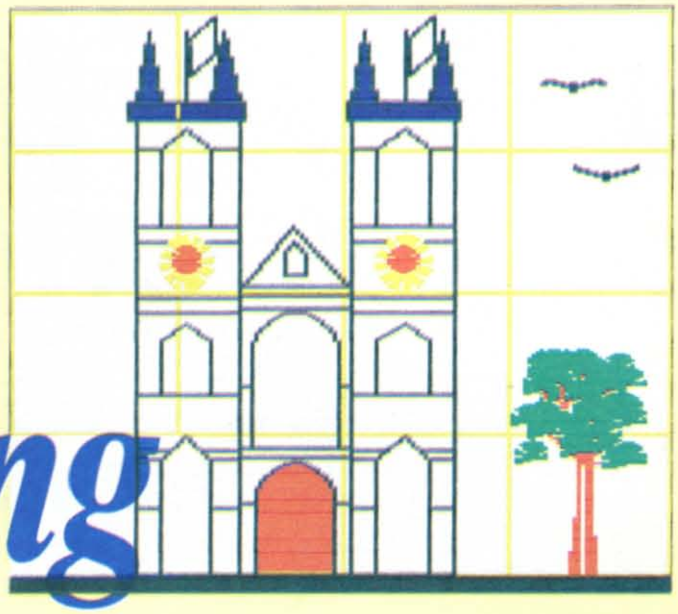
NAME ....
COMPANY ....
ADDRESS ....
....
POSTCODE .... TELEPHONE NO. ....
CARD NO. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Please send this coupon to:

Reflex Magnetics Limited, Unit 2, 32 Lawn Road, London NW3 2XU
or 'phone us on (01) 722 9231

MU7

Royal Wedding



By GORDON KEY and DAVID McLACHLAN

TO celebrate this month's Royal Wedding we've come up with a real tester – a sliding block puzzle based on the happy occasion.

When you run the program you will be offered a choice of four inbuilt pictures on the wedding theme or of loading a pre-recorded Mode 2 screen of your own. You will then be presented with the complete picture.

Once you've studied it, shuffle the picture with Tab and attempt to solve the resultant jumble. The keys you'll need to sort it all out are:

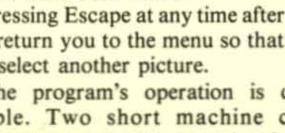
:	**Move tile up**
/	**Move tile down**
X	**Move tile to right**
Z	**Move tile to left**

Tab can be pressed at any time to further shuffle the tiles. Should you give up, pressing Return will undo all your moves and any entered by Tab, and the puzzle will be solved for you in a few seconds – provided less than 2000 moves have been made!

Pressing Escape at any time after that will return you to the menu so that you can select another picture.

The program's operation is quite simple. Two short machine code routines are assembled at &110 and &900. The first is used to move a block or tile by accessing the screen directly, and the second prints large letters.

The first routine unfortunately makes the program incompatible with the 6502 second processor and shadow modes, but it is necessary for speed.



The screen is split into 16 equally sized tiles which are numbered from 0 to 15. Two integer variables, *N%* and *O%*, are then used to pass the new and old tile numbers to the assembly routine via the CALL statement using the parameter block provided in page six by Basic. The routine also transfers the contents of the

VARIABLES

A%	Flag for PROCmove and a CALL variable for PROCbig.
C%	General purpose for colour value.
D%	Start of data storage for saving moves.
E%	Determines souvenir balloon's speed.
F%	Local flag for FNpic5.
H%	Byte pointer for move storage.
I%	Inkey value and secondary counter.
M%	Call address for the machine code routine.
N%	New tile number (the tile that will be moved).
O%	Old tile number (the number of the blank space).
P%	Bit pointer for move storage.
R%	Value for the radius of the circle drawn by PROCc.
S%	Flag to indicate that at least one move has been saved.
FI%	Number of steps in circle loop.
ST%	Step number.
TY%	Type of circle (filled, not filled, spoked).
COL%	Colour of circle.
c(24)	Cosine array.
s(24)	Sine array.
$D%	Used by FNpic5 for passing strings to the command line interpreter.

first variable to the second.

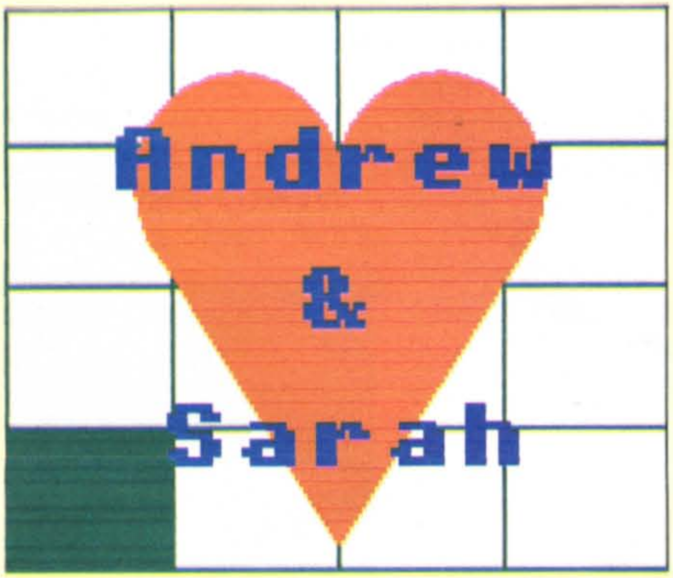
Each time a tile is moved – including random moves generated by pressing Tab – the move is recorded by PROCsave. This stores four moves in a single byte of memory starting at &A00. Due to this efficient method of storage almost 2000 moves can be safely stored.

Pressing Return solves the problem by simply reversing all moves until the picture is restored. If the computer beeps while you are playing, it means that the available storage memory is full and you have two options.

You can either press Return to solve the puzzle, or press C to continue, but note that Return will no longer solve the puzzle as the counter *(H%)* is zeroed.

If you select option 5 in order to load your own Mode 2 picture this should have been previously saved to tape or disc using the command *SAVE <filename> 3000 +5000.

On selecting this option you are given the choice of entering a filename or a star command. This facility is useful for cataloguing tape or disc, changing drives and so on, though take care as some commands could destroy the program (selecting another language for example).



If a disc error occurs this will be displayed for a short period before you are returned to the menu.

When saving your own screen, it is advisable to set up a window using VDU 28,0,31,4,25. Although this makes reading a little difficult, anything that you type or the computer outputs will print on the part of the screen where the missing tile starts and not destroy your picture.

You should note that due to the length of the program several sections are deleted after use before the main program is run. It is therefore essential that you do not add any extra spaces as you type it in and save the program before running it.

Also the program is downloaded to &1100 if page is higher. This still allows users of most types of DFS to load their own Mode 2 screens.

The following function keys are defined and called from within the program:

- ***f0* Downloads the program if necessary.**
- ***f1* Deletes all the assembler code.**
- ***f2* Deletes the instructions.**

Full listing starts on Page 109

PROCEDURES

play	The main game repeat loop. Repeats indefinitely until Escape is pressed.
move	If *A%* is TRUE this procedure makes the souvenir balloon picture move by redefining the actual colour displayed by colour numbers 1 through 12.
get	Gets keyboard input and returns the new title number *(N%)*.
del(d%)	A delay procedure that runs independently of TIME.
save(h%)	Records each move whether entered from the keyboard or generated by PROCshuffle. Each move is stored as a two bit number thus enabling four moves to be stored per byte of memory.
solve(d%)	Solves the puzzle by reversing all moves until the picture is restored.
shuffled()	Randomly shuffles the picture tiles.
	Draws a circle controlled by the numerous parameters.
grid(gc%)	Draws the grid in the colour gc% that separates the 16 picture titles and sets the initial values for the puzzle.
title	Sets the initial program variables and runs the title sequence.
writeword (x%,y%,word$)	Writes *word$* in big letters at *x%,y%*.
f(X%,Y%,C%)	Fills an area from *X%,Y%* in the colour *C%*
inst	Prints the menu of options, gets the one required and returns a string that tallies with the appropriate picture function.
dim	Dimensions and sets the values of the SIN and COSIN arrays used by PROCs.
big(A$,X%,Y%,c%)	Prints *A$* at *X%,Y%* in colour *c%* and in double height characters.
code	The assembly language procedure for moving the tiles.
code2	The assembly language for the big letters routine.

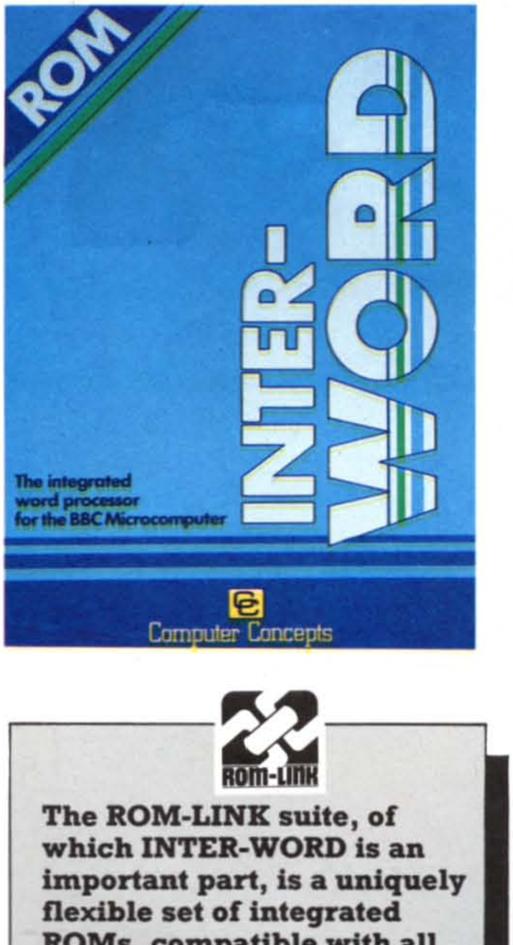
INTER-WORD

INTER-WORD is the ultimate word processor for the BBC micro. Just look at its features:

- Part of the only truly integrated suite of programs for the BBC micro.
- The most comprehensive WYSIWYG image of the final document, fully paginated, centred text, justification, etc.
- Super-fast smooth scrolling in all available modes. Sideways scrolls as well if necessary.
- Documents may be edited in any of 40, 53, 80 or 106 column screen modes.
- Multiple copies.
- Multi-column printout.
- On-screen bold, underlining and marked areas shown.
- Easily set preferences including: screen colours, key repeat rate, line numbering, cursor line, etc.
- Printer setup to allow simple access to any printer effects on any printer.
- Pull down menu driven throughout. Menus exist for printer setup, page size, preferences, spelling check, status, etc.
- Easy selection of filenames for save or load; all filenames in current directory are listed on-screen.
- Fully compatible with DFS, ADFS and ECONET.
- ALL FEATURES OPERATE FULLY ON: MASTER, B+128, B+, standard-B, B with Watford or Aries shadow RAM.

ROM-LINK programs can all hold their data in memory simultaneously. In fact, each may hold more than one set of data. This means that INTER-WORD can cope with more than one document in memory at once.

THE INTEGRATED WORD PROCESSOR FOR THE BBC MICRO



ROM-LINK

The ROM-LINK suite, of which INTER-WORD is an important part, is a uniquely flexible set of integrated ROMs, compatible with all models of the BBC micro.

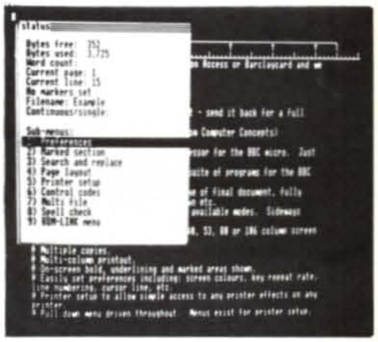
MONEY-BACK

Guarantee

Buy INTER-WORD—if you don't like it—send it back for a full refund!

(Available when purchasing direct from Computer Concepts)

Data may be transferred from one program to another with the minimum of effort. A spreadsheet may easily be transferred to INTER-WORD and re-arranged to suit the format of the document. Similarly a spreadsheet set up in INTER-WORD may be directly imported into INTER-SHEET.



```
status
Bytes free:  752
Bytes used:  3,725
Word count:
Current page: 1
Current line: 15
No markers set
Filename: Example
Continuous/single:

Sub-menus:
1) Preferences
2) Marked section
3) Search and replace
4) Page layout
5) Printer setup
6) Control codes
7) Multi file
8) Spell check
9) ROM-LINK menu
```

```
n Access or Barclaycard and we
 - send it back for a full
n Computer Concepts)
essor for the BBC micro.  Just
suite of programs for the BBC
e of final document, fully
n etc.
available modes.  Sideways
0, 53, 80 or 106 column screen
* Multiple copies.
* Multi-column printout.
* On-screen bold, underlining and marked areas shown.
* Easily set preferences including: screen colours, key repeat rate,
line numbering, cursor line, etc.
* Printer setup to allow simple access to any printer effects on any
printer.
* Pull down menu driven throughout.  Menus exist for printer setup,
```

INTER-WORD is 32K long (longer than any other BBC word processor)—BUT—due to a unique design, it is supplied in just ONE CHIP compatible with all machines.

No other so-called integration system is as powerful. Other systems can only transfer data in a very limited way, making it impossible to transfer figures from the word processor into the spreadsheet for example. No other system can support data from different programs in memory at the same time.

COMPATIBLE WITH THE BBC MICRO MODELS B, B+, B+128 & MASTER

INTER-WORD

INTER-WORD shows an accurate image of the final printed text during editing. It is continually re-formatted as new text is entered, so ensuring that the screen always accurately represents the final document. Justified text is also shown while editing; this includes left, right and fully justified and centred text.

The layout of text is controlled by rulers. These are extremely easy to insert and just as easily changed to give a different format. Any aspect of the ruler can be changed by 'dragging' its position marker using the cursor keys. No description can do justice to the intuitively simple ruler editing.

Although embedded commands are little used in INTER-WORD, some embedded commands are still allowed and may be 'hidden' in the text without upsetting the screen format, appearing only if they need to be edited. ANY codes for ANY printer can be included at ANY point within the text. Standard effects such as bold and underlining are shown on-screen. A simple printer code menu allows codes for any printer to be easily included.

Multiple-column printout facility is an integral feature. After setting the text width to suit one column and setting the number of columns, printing out is just a matter of pressing a key.

INTER-WORD uses a similar method of marking sections of text to WORDWISE. This provides a simple and very effective means of moving or copying any section of text to any other position in the document. However INTER-WORD has extended the marked section idea so that it may be centred or underlined or emboldened etc.

Comprehensive search and replace functions are included. The search and replace strings are stored so they may be used again and again. The user has the choice of case dependent searches or not. Wildcards are allowed.

INTER-WORD is very easy to use. Page format, preferences etc. are controlled from a series of pull down menus. Incorrect settings are impossible to enter, being rejected before they can cause a problem.

The latest computers make use of menus in the same way as INTER-WORD. There is no need to remember long lists of commands or values which may follow them, all options are shown on the menus.

For example there is a 'preference' menu. This allows easy selection of screen colour, key repeat rates, screen mode, whether TABS and CR are shown on screen or not, etc. There is a comprehensive 'printer setup' menu. This controls things like the number of copies printed, the number of columns, the line spacing etc.

Another menu is for control codes, so that the codes for underlining, bold and other screen effects may be set for any printer.

Saving and loading is performed via a file selector menu which lists the filenames and allows selection by name or by moving the cursor. Once tried, any other method of entering filenames becomes a real chore.

Most functions are controllable by one or two key presses as an alternative to menus. This allows users to choose whichever option suits their preference and experience.

There is even a menu giving direct access to the associated SPELLING CHECKER ROM expected to be released later this year. This will be an entirely ROM based checker with over 50,000 words on chip ensuring that it is extremely fast. It also allows user defined dictionaries on disc or sideways RAM.

20%

DISCOUNT

—Available to owners of WORDWISE PLUS. Simply quote your registration number, name and address when ordering direct for a discount price of £39.20 + VAT (£45.08 incl.)

PRICE: £49.00 + VAT (£56.35 incl.)

Computer Concepts

Gaddesden Place, Hemel Hempstead, Herts HP2 6EX

EXPRESS ORDERS

Telephone our hotline with an order on Access or Barclaycard and we will despatch it the same day.

(0442) 63933

MICROWORLD

· COMPUTER GROUP ·

BRANCH NETWORK THROUGHOUT THE U.K.

LONDON

Park House
140 Battersea Park Road
London
01 627 4840

BIRMINGHAM

39 Waterloo Street
Birmingham
021-236 7772

GLASGOW

11 Bath Street
Glasgow
041 332 1116

Anderson Cross Centre
Glasgow
041 226 3011

EDINBURGH

Constable House,
Hopetoun Street,
Edinburgh 031 557 4196

12 Leven Street
Edinburgh
031 228 1111

ABERDEEN

41 Albert Street
Aberdeen 0224 571735

EDUCATIONAL SPECIALIST

Microworld are Scotland's sole Scottish based distributor with vast experience of Econet and can offer installation, service, advice and supply throughout the U.K. Our London office is now open to service the entire country. Please call for our latest Educational Prices or phone for our list of dealers nationwide. Remember we are never ever undersold.

Computers

BBC Master 128	P.O.A.
BBC Master 128K with Epson P-40 printer and cables	£519.00
BBC Master 128K with Opus 100K 40T 5.25" disc drive	£529.00
BBC Master 128K with P-40 printer and Opus disc drive	£565.00
BBC Master 128K with Juki 5510 printer and cables	£669.00
BBC Master 128K with Cumana CSX400 disc drive	£579.00
BBC Master 128K with Juki 5510 and CSX400	£788.00
BBC Master 128K Econet Terminal	£369.00
512 Upgrade for the BBC Master 128K	P.O.A.
Turbo Upgrade for the BBC Master 128K	£115.00
Reference Manual I for the BBC Master 128K	£14.95
Reference Manual II for the BBC Master 128K	£14.95
Advanced Reference Manual for the BBC Master 128K	£19.95
Atari 520ST Computer with 3.5" disc drive, monitor, mouse and software	£749.00
Atari 520ST system as above, with Star SG-10 printer	£799.00
Atari 520ST M system (CPU with TV Modulator, no drives or monitor)	£399.00
Atari 1040ST Computer with 1Mb RAM, disc drive, monochrome monitor, mouse and software	P.O.A.
Amstrad 6128 Computer with colour monitor	£399.00
Amstrad 6128 Computer with monochrome monitor	£299.00
Amstrad 8256 Computer with monochrome monitor, disc drive and printer	£458.00
Epson Personal Computer range	P.O.A.
Nimbus range	P.O.A.
MBC555 16-Bit with Zenith green monitor, Wordstar, Calcstar and Star SG-10 printer and cable	£699.00
Apricot F1 Computer	£399.00

Monitors

Microvitec 1431 normal resolution colour monitor	£209.00
Microvitec 1451 medium resolution colour monitor	£279.00
Microvitec 1441 high resolution colour monitor	£506.00
Microvitec 1431 MS4/AP normal resolution audio/PAL colour monitor	£279.00
Microvitec 1451 MS4/AP medium resolution audio/PAL colour monitor	£345.00
Zenith green screen monochrome monitor	£89.95
Zenith amber screen monochrome monitor	£89.95
BMC high resolution green screen monochrome monitor	£119.95

IN THE MARKET?

We at Microworld believe that our price to end user and education cannot be beaten and accordingly we give you our

PRICE PROMISE

Phone now for details
(Subject to conditions).

RESEARCH MACHINES
MICROCOMPUTER SYSTEMS

RM NIMBUS

FROM
ONLY
£695*
(Ex. VAT)

Processors

Acorn Z80 Second Processor	£349.00
Acorn 6502 Second Processor	£199.00
Torch Z80 Second Processor with dual drive	£540.00

DFS Kits

Acorn 8271 DFS kit (fitted)	£89.00
Acorn 8271 DFS kit (unfitted)	£69.00
Acorn 1770 DFS kit (fitted)	£59.95
Acorn 1770 DFS kit (unfitted)	£54.95

MICROWORLD

·LONDON: 01-627 4840 BIRMINGHAM: 021-236 7772·

CUMANA DISC DRIVES

· Equivalent drives may be supplied. Add £69.00 for 8271 DFS Kit with DNFS.

CD 800S

5¼″ Double-sided 800K dual disk drive 40/80 track switchable with own Power supply

PLUS 10 FREE ACORNSOFT GAMES DISCS WORTH £120.00

RRP £449.95

ONLY £299.95* R.R.P.

CS 400S

5¼″ Double-sided 400K single disk drive 40/80 track switchable with own Power supply

PLUS 10 FREE ACORNSOFT GAMES DISCS WORTH £120.00

RRP £289.95

ONLY £159.95* R.R.P.

CSX 400S

5¼″ Double-sided 400K single disk drive 40/80 track switchable. Powers from the BBC computer

PLUS 10 FREE ACORNSOFT GAMES DISCS WORTH £120.00

RRP £259.95

ONLY £139.95* R.R.P.

CSX100

5¼″ Single-sided 100K single disc drive 40 track. Powers from the BBC computer

ONLY £89.95*

CSX 531

3.5″ Single-sided 100K single disc drive 40 track. Powers from the BBC computer.

ONLY £69.95*

How to Order

Orders by post welcomed: please mail coupon with payment.
Telephone orders welcome: call 01-627 4840 (London) or 021-236 7772 (Birmingham) or 031-228 1111 (Edinburgh) or 041-332 1116 (Glasgow).
We also welcome Government and Educational orders.
All products supplied include our own 12 months guarantee backed by our own service centre staffed by fully qualified engineers.
Order with confidence, 7 days money back guarantee.
All charges include VAT and carriage charges by courier. Dealer enquiries and personal callers welcome. All offers stated here are available through any of Microworld's 50 dealers nationwide.
The right is reserved to alter prices without prior notice.
All items subject to availability. E&OE.

MAIL ORDER

To: Microworld Distribution, Dept. MU, Park House, 140 Battersea Park Road, London SW11
01-627 4840 or alternatively 39 Waterloo Street, Birmingham 021-236 7772.

Please send me ______________________

____

☐ I enclose a cheque for £.................... payable to Microworld Computer Systems Ltd.

☐ Please debit my Access/Visa/American Express Account

No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signed ______________

Name ______________ Address ______________

____

MICROWORLD

EDINBURGH: 031-557 4196 031-228 1111

MASTERFUL OFFER FROM MICROWORLD

1 OFFER

BBC MASTER 128K,
Epson P-40 Printer, BBC Printer Cable, carriage by Securicor.

FOR £519

2 OFFER

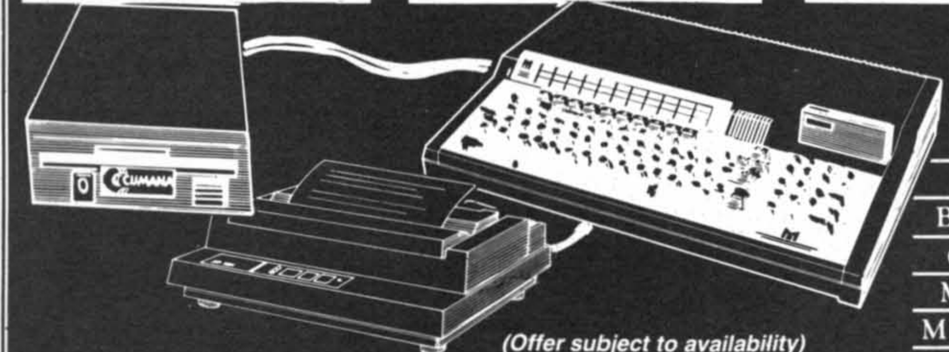
BBC MASTER 128K
Opus 100K 40t 5.25″ disc drive, manuals, formatting disc and cables, carriage by Securicor.

FOR £529

3 OFFER

BBC MASTER 128K,
Epson P-40 Printer, Opus 100K 40T 5.25″ disc drive, formatting disc and cables, carriage by Securicor.

FOR £565



(Offer subject to availability)

BRITISH
BROADCASTING
CORPORATION
MASTER SERIES
MICROCOMPUTER

4 OFFER

***BBC MASTER 128K,**
Cumana CSX400 disc drive, manuals, formatting disc and cables, carriage by Securicor.

FOR £579

5 OFFER

BBC MASTER 128K,
Juki 5510 printer, BBC printer cable, carriage by Securicor.

FOR £669

6 OFFER

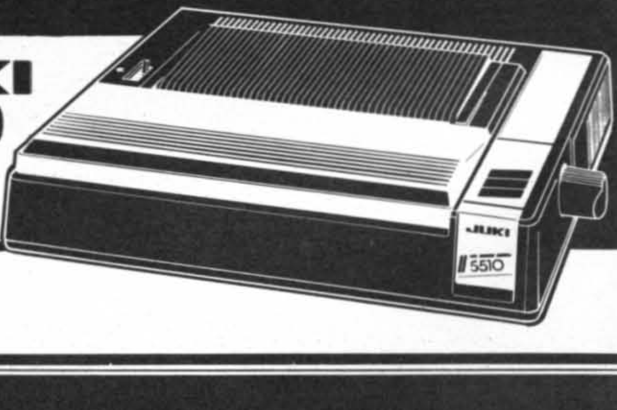
***BBC MASTER 128K,**
Juki 5510 printer, BBC printer cable, Cumana CSX400 disc drive, manuals, formatting disc and cables, carriage by Securicor.

FOR £788

** ADD £130 FOR CD800S INSTEAD OF CSX400*

BRITISH
BROADCASTING
CORPORATION
MASTER SERIES
MICROCOMPUTER

JUKI
5510



MICROWORLD

EDINBURGH: 031-557 4196 031-228 1111

10 ACORNSOFT
DISC GAMES WORTH £120.00

FOR £19.99

INCL V.A.T.

N.B. CARRIAGE £2 EXTRA

Make no mistake this offer is yet another Microworld exclusive. Nowhere else will you find all this quality disc software for so little. All the games are both 40 and 80 track compatible and therefore suitable for use with any 5¼" disc drive and your BBC B Computer. This means that each disc costs you only £1.99 each. we doubt you could buy quality blank discs at that price. Here are the titles from which we will send you a random selection of ten:

1 QUEST
2 MONSTERS
3 SNAPPER
4 ROCKET RAID
5 SPHINX
6 METEORS
7 ARCADIANS
8 PLANETOID
9 SUPER INVADERS
10 FIREBUG
11 COUNTDOWN TO DOOM
12 STARSHIP COMMAND
13 HOPPER
14 CAROUSEL
15 KINGDOM OF HAMIL
16 CRAZY TRACER
17 DROGNA
18 FREEFALL
19 METEOR MISSION
20 BOXER
21 TETRAPOD
22 VOLCANO
23 BLACK BOX

How to Order

Orders by post welcomed: please mail coupon with payment.

Telephone orders welcome: call 01-627 4840 (London) or 021-236 7772 (Birmingham) or 031-228 1111 (Edinburgh) or 041-332 1116 (Glasgow).

We also welcome Government and Educational orders.

All products supplied include our own 12 months guarantee backed by our own service centre staffed by fully qualified engineers.

Order with confidence, 7 days money back guarantee.

All charges include VAT and carriage charges by courier. Dealer enquiries and personal callers welcome. All offers stated here are available through any of Microworld's 50 dealers nationwide.

The right is reserved to alter prices without prior notice.

All items subject to availability. E&OE.

MAIL ORDER

To: Microworld Distribution, Dept. MU, Park House, 140 Battersea Park Road, London SW11
01-627 4840 or alternatively 39 Waterloo Street, Birmingham 021-236 7772.

Please send me ____________________

____

☐ I enclose a cheque for £.................... payable to Microworld Computer Systems Ltd.

☐ Please debit my Access/Visa/American Express Account

No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signed ____________________

Name ____________________ Address ____________________

____

MICROWORLD

GLASGOW: 041-226 3011 041-332 1116

JUKI 6100

RRP £470
OUR PRICE
£239.95
With BBC PRINTER CABLE and Carriage by Securicor

FEATURES

1 18 c.p.s.
2 Standard Daisywheel — 10/12/15 pitch
3 Diablo 6/30 protocol
4 Tractor and sheet feed available
5 Free carriage by Securicor

OTHER SPECTACULAR PRINTER BARGAINS

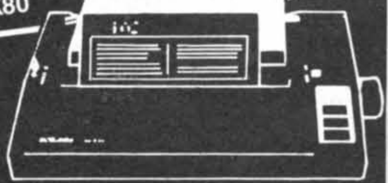
Juki 6100 daisywheel printer 18 cps	£239.95
Juki 6300 daisywheel printer 40 cps	£799.00
Juki 5510 NLQ dot matrix printer 180 cps	£209.00
Juki Colour Kit (for the conversion of 5510)	£109.95
Star Powertype daisywheel printer 18 cps	£259.00
Star SG-10 NLQ dot matrix printer 120 cps	£229.00
Star SG-15 NLQ dot matrix wide carriage printer 120 cps	£369.00
Star SD-10 NLQ dot matrix printer 160 cps	£369.00
Star SD-15 NLQ dot matrix wide carriage printer 160 cps	£489.00
Star SR-15 NLQ dot matrix wide carriage printer 200 cps	£589.00
Star STX-80 thermal printer	£139.00
Star NL10 NLQ dot matrix printer 120 c.p.s. draft 30 c.p.s.	£258.00
Star NB15 24 pin dot matrix printer 300 c.p.s. draft 100 c.p.s. NLQ	£995.00
Canon PW1080A NLQ dot matrix printer 160 cps	£289.00
Canon PW1156A NLQ dot matrix printer 160 cps wide carriage	£399.00
Canon PJ1080A NLQ dot matrix printer 160 cps 7 colour printer	£499.00
Epson LX80 dot matrix printer 100 cps draft 16 cps NLQ	£239.00
Epson FX85+ dot matrix printer 160 cps draft 32 cps NLQ	£399.00
Epson FX105+ dot matrix wide carriage printer 160 cps draft 32 cps NLQ	£599.00
Epson LQ1500 24 pin dot matrix printer 200 cps draft 67 cps NLQ	£1095.00

EPSON LX80

FEATURES

1 100cps — bidirectional logic seeking
2 16 c.p.s. NLQ
3 Italics, bold, underlining and many more font styles
4 Compatible with most software
5 Tractor feed — only £25 extra. Sheetfeed **ONLY £65.95**

RRP £295
OUR PRICE ONLY £229
EPSON LX80



RRP £345

JUKI 5510

FEATURES

1 180cps (draft) bidirectional logic-seeking
2 32 cps correspondence quality NLQ
3 3KB, expandable up to 15KB buffer
4 Less than 60 dBA — for a quiet office
5 Friction and tractor feed as standard
6 Parallel interface
7 Serial RS232, Sheet Feeder and colour upgrade kits optional extras
8 Epson and IBM Graphic dumps in either colour or monochrome.

OUR PRICE ONLY £209 incl. V.A.T.

MICROWORLD

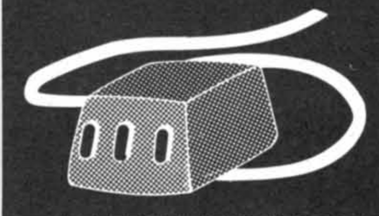
· COMPUTER GROUP ·

Modems

Pace Nightingale modem	£139.95
Minor Miracles WS2000 modem	£129.95
Minor Miracles WS3000 modem	£295.95
Commstar I	£27.00
Commstar II	£34.95
Termulator	£25.00
Communicator	£50.00
Autodial	£30.00
Autoanswer	£30.00

AMX Mouse and Software

AMX Mouse	£79.95
AMX Pagemaker	£48.00
AMX 3D-Zicon	£22.00
AMX Database	£22.00
AMX XAM	£22.00
AMX Desk	£22.00
AMX Utilities	£14.95
AMX Paintpot	£14.95
AMX ROM Expansion Board	£49.95



AMX MOUSE

IMAGINATION AT YOUR FINGERTIPS.

Ribbons

Standard Star SG ribbon	£3.50
Standard Star SD ribbon	£5.50
Standard Star SR ribbon	£5.50
Standard Canon ribbon	£11.50
Standard Epson ribbon	£4.50
Standard Shinwa ribbon	£5.50
Juki 6100 ribbon	£2.50
Star Powertype ribbon	£4.50
Amstrad PCW ribbon	£7.95

Cables

BBC printer cable 1 metre	£10.00
BBC printer cable 1.5 metre	£12.50
BBC printer cable 2 metres	£15.00
Atari printer cable	£29.95
Amstrad printer cable	£19.95
Serial printer cable	£25.00
Phono to Phono cable	£3.50
BNC to Phono lead	£3.50
6-pin to 6-pin RGB lead	£3.50
Centronics to Centronics cable 1.5 metres	£13.50
Centronics to Centronics cable 2 metres	£13.50
7-pin to 7-pin cassette cable	£3.50
7-pin to 5-pin 2-jack cassette cable	£3.50
7-pin to 3-jack cassette cable	£3.50
5-pin Domino modem cable	£4.50

ROMS

Datagem	£99.95
Printmaster	£29.00
Disc Doctor	£27.00
Gremlin	£27.00
Caretaker	£27.00
Graphics	£27.00
Wordwise	£29.00
Wordwise Plus	£48.00
Basic Editor	£29.00
GXR	£24.00
ISO Pascal	£56.00
Logo	£49.95
View (Electron version)	£29.95
Viewsheet (Electron version)	£29.95
Logo (Electron version)	£29.95
Pascal (Electron version)	£29.95
Intersheet	£56.35
Interchart	£36.80
Interbase	POA
Interword	POA
Speech ROM	£16.00
Acorn Speech Synthesiser system	£25.00
Termi I	£29.95
Termi II	£34.95
BCPL	£47.95

PHONE NOW FOR OUR SPECIAL OFFERS

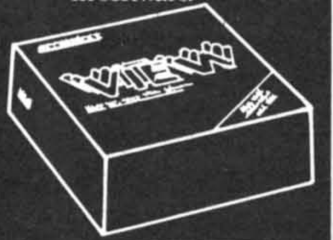
Discs

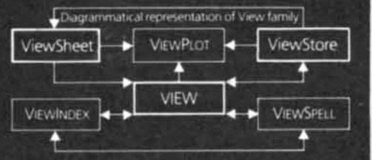
Parrot 40 track (box of 10)	£11.50
Parrot 80 track (box of 10)	£22.00
Sony 3.5" single sided (box of 10)	£32.00
Sony 3.5" double sided (box of 10)	£50.00
Panasonic 3" double sided (box of 10)	£60.00
Maxell 3" double sided (box of 10)	£69.00
Nashua 80 track double sided (box of 10)	£29.95

The View Family

View	£39.00
View 3.0	£60.00
View Guide	£5.00
Into View	£5.00
View 3.0 User Guide	£10.00
ViewSheet	£39.00
ViewSheet User Guide	£10.00
Printer Driver Generator	£9.95
ViewIndex	£11.00
ViewStore	£39.00
ViewSpell	£29.95
ViewPlot	£26.00
Eprom Cartridge	£14.95

ACORNSOFT
The choice of experience in software.





How to Order

Orders by post welcomed: please mail coupon with payment.
Telephone orders welcome: call 01-627 4840 (London) or 021-236 7772 (Birmingham) or 031-228 1111 (Edinburgh) or 041-332 1116 (Glasgow).
We also welcome Government and Educational orders.
All products supplied include our own 12 months guarantee backed by our own service centre staffed by fully qualified engineers.
Order with confidence, 7 days money back guarantee.
All charges include VAT and carriage charges by courier. Dealer enquiries and personal callers welcome. All offers stated here are available through any of Microworld's 50 dealers nationwide.
The right is reserved to alter prices without prior notice.
All items subject to availability. E&OE.

MAIL ORDER

To: Microworld Distribution, Dept MU, Park House, 140 Battersea Park Road, London SW11 01-627 4840 or alternatively 39 Waterloo Street, Birmingham 021-236 7772

Please send me ____________________

____

☐ I enclose a cheque for £ ________ payable to Microworld Computer Systems Ltd.

☐ Please debit my Access/Visa/American Express Account

No ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signed ____________

Name ____________ Address ____________

____

THE MICRO USER

Guide to sideways ROMs

Assemblers/Monitors

ADE	£59.95	16k	sys	Complete development package for assembly language programmers. ROM contains a 6502 macro assembler, text editor, monitor and disassembler.
AID	£24.35	8k	lms	Features unique dual screen facility enabling two concurrent screens, so use of AID monitor does not mean loss of your graphics screen. 40 commands.
ASM	£34.93	8k	sys	ASM provides all the features of the ADE macro assembler on its own ROM. The program source file may be written using any editor (even Wordwise or View!). Reference manual and utility/macro library disc.
BEEBMON	£27.60	8k	wat	6502 disassembler/monitor package. Allows full emulation of 6502, with correct handling of code in any sideways ROM, including DFS.
EXMON II	£27.80	8k	bbs	Features dual screen operation, a full screen memory editor and over 60 commands. If you are debugging a program with a visual display, you can single step through it and watch the effect on the screen. You can also revert to the monitor screen at the press of a key to examine registers, edit code, read variables, alter memory and so on.
FMON	£10.35	8k	fso	Machine code monitor which is relocatable to any part of RAM. There is a line by line assembler and a relocator program. It has all the usual monitor routines such as block move, change memory, disassemble, trace mode, break points and full support of VDU and MOS commands. FMON also has more powerful commands, including user-defined variables and procedures.
GREMLIN	£33.35	8k	cco	This is a machine language monitor ROM designed for use as an aid to development and debugging of machine code programs. It works in any screen mode and has a built-in help menu.
MACRON	£30.00	16k	cms	A macro assembler for the BBC Micro. Provides its own screen editor with automatic formatting on screen. Assembly can be from disc to disc so allowing very long source codes, limited only by disc space. Features include conditional assembly, user defined macros, chaining source files and so on.
ROMAS	£51.75	16k	wat	Powerful multi CPU assembler for 6502, 65C02, Z80, 8085, 8041, 6809 and Z8 processors. Includes macro editor, powerful assembler directives and disc to disc assembly.
SPY2	£29.99	8k	sys	A front panel debugging monitor, disassembler and disc utility ROM for inspecting, modifying, debugging and disassembling machine code programs. Also features a relocator and program trace facilities. SPY2 will access any ROM. ROM memory may be displayed, single-stepped or disassembled. Includes a disc formatter as well as a non-destructive single track reformatter.
VASM	£23.00	16k	auc	Assembler with extended instruction set for 65C02. Produces Intel object code files, and has a routine to convert to binary image. Includes local labels, conditional assembly, dynamic equate facility and file include facility.

Toolkits

ADDCOMM	£28.00	8k	vin	Graphics and toolkit ROM adding 40 new commands to Basic including sort routine and graphics fill.
ADVANCED ROM MANAGER	£9.99	8k	acp	Utility for ROM and sideways RAM users. Features bi-directional hex/Ascii/65C02 disassembler and editor. Turn off unwanted ROMs and make files suitable for ROM filing system.
ADVANCED DISC TOOLKIT	£34.00	16k	acp	It features ADFS disc utilities in ROM; disc commands automatically operating in DFS/ADFS; memory editor operating on both sides of the Tube; hex/Ascii/65C02 disassembler editor; memory/disc editor operates in 40/80 column modes; transfer files between disc, tape, ADFS, Net.
ADVANCED DISC INVESTIGATOR	£28.75	16k	acp	Disc utility. Features: Backs up most protected disc; copies 40 track to 80 track; verifies to name; standard disc edit; checks and repairs faulty track; creates new disc format; operates in single and double density with 1770.
BASIC EDITOR	£29.00	16k	aco	A utility ROM which provides powerful full-screen editing facilities for developing and maintaining Basic programs. Many of the facilities of a word processor are provided such as the ability to move or copy blocks of program lines. In addition you can define the target of jump instructions as labels and then automatically insert the appropriate line number when the editing sequence is complete.
BASIC EXTENSIONS	£19.95	16k	mpw	Adds three new structures and further LISTO options: WHILE, ENDWHILE, CASE, WHEN, OTHERWISE, ENDCASE, LOOP, EXITIF, ENDEXIT, ENDLOOP, FIF, THEN, ELSEIF, ENDIF. Altogether there are nine new statements and 16 new commands. Also adds a variety of new keywords to Basic.
BROM	£30.00	8k	cla	Full screen editing of Basic programs. Provides 21 extra commands for Basic programmer, including error trapping variable lister, formatted lister, find and replace (including Basic keywords), ROM on/off.

BROM+ £34.50 16k	cla	Contains most of the commands of BROM plus commands related to disc handling and several utilities. Disc commands include disc edit, disc find, format (both sides), DGET and DPUT. General commands include FNkey, memory edit, memory find, ROM list, ROM on/off. Basic commands include a fast cross referencer and partial renumber.
CARETAKER £29.00 8k	cco	Includes 17 new commands to aid writing and debugging Basic programs. For instance *RENUMBER can renumber parts of programs and move them to any other position in the program. *SQUASH packs a program down to the smallest it can go.
DISC DOCTOR £29.00 8k	cco	A general purpose utility ROM adding 20 new commands to the BBC Micro. The extensive range of disc commands includes a disc search routine, a sector editor, and a formatter which gives the capability for 60 files per side. The more general purpose commands include some memory search routine, and an interactive memory editor (MZAP). Also included is a disassembler.
FLOPPY-WISE PLUS £20.95 16k	sof	Half of this 40 command toolkit is for disc users, with search and edit functions, repair, tape/disc transfer, clone disc backup, multicopy, disc protect, and an automatic menu for any selected drive. Basic programmers are catered for with find and move commands, search and edit routines for both sides of the Tube and any sideways ROM, and autosave. Also included is a full menu-driven ROM management system with RAM load and save.
GRAPHICS ROM £29.00 8k	cco	Includes over 28 new graphics related commands. Sprite graphics and LOGO type turtle graphics are provided, as are commands for filling a shape with colour, circle and arc drawing, 3D graphics routines, drawing large multicoloured characters, routines for scaling all subsequent graphics commands, making the results bigger or smaller, or rotating all further graphics output by a certain angle around a certain point.
INTER-CHART £32.00 16k	cco	A graph and chart drawing program which can take data from either the keyboard, from an Ascii file prepared on a word processor, or directly from another ROM-LINK package, such as INTER-SHEET. Graphs can be either line, bar or pie charts, and all aspects of the graph can be controlled by the user. Provision is made to allow dumping to a printer.
MATRIX £41.40 8k	vin	Use Basic commands to perform matrix operations including arrays, linear simultaneous equations. Swap names of variables.
MEGA ROM £34.95 16k	chs	Adds over 60 commands to your BBC Micro. Covers graphics, sound, printing, programming, disassembly, memory and disc search and edit, re-direction on pressing Break, file-handling and formatting.
PRINTMASTER £29.00 8k	cco	This printer utility ROM enables the user to access the special features of their printers easily. Two versions are available, one supports the Epson MX, RX, FX and compatible range, and the other is for the STAR Delta, DP, Gemini and Radix printers. Printmaster can dump a fully shaded version of any mode screen to the printer, even Mode 7 teletext graphics.
ROM MASTER £14.95 8k	chs	Incorporates several utilities to help prevent the interference which can occur between ROMs, as well as commands to encrypt and de-encrypt a file based on an entered password.
SCYTHE £24.00 8k	chs	Covers ROM management, utilities for the disc user, aid for the machine code or Basic programmer, as well as general utilities.
SLEUTH £27.80 8k	bbs	This Basic debugging tool features single stepping through Basic, dual screen operation, breakpoints, accelerator, full feature control screen and trace,a sophisticated line trace facility.

SPEECH ROM £29.00 8k	cco	This ROM uses one of the Acron speech chips, the TMS 5220, to provide an infinite vocabulary. Phrases are entered as a series of phonemes, the individual sounds needed to make that phrase. The phrase can be given a specific intonation pattern, which means you can emphasise certain words, or express surprise, resignation and so on. It can even sing!
TOOLKIT PLUS £33.90 16k	bbs	Basic programmers' aid. It offers over 40 new command features which may be called individually or from a menu. It includes a powerful full-screen editor and a unique syntax checker, which will spot mistakes as you key in your program.
TOOLSTAR £29.57 8k	pac	A suite of programmers' tools which have been designed specifically to aid program development and debugging. It is transparent to the user and operating system and occupies no user RAM. Comes with comprehensive easy to use manual. The many commands are in three groups: Basic, disc and memory tools. Toolstar can also utilise your own routines in RAM.
VIEWSPELL £39.95 8k	aco	An automatic spelling checker, enabling you to produce error-free documents every time. The program will check each word in your document against its master dictionary of 70,000 words. Alternatively, create your own dictionary of technical terms or names and addresses. ViewSpell can also search your dictionary for words beginning or ending with certain letters.

Wordprocessors

ALPHA £34.50 16k	auc	A fully-fledged word and language processor with built-in lexicon. Can be used to build up a word list for classroom or individual use.
EDWORD2 £45.95 8k	clw	Includes a comprehensive range of facilities and is easy to use. It can be used at primary and secondary schools, and also at universities. It is also of value as a writing tool for children with special needs. It comes complete with comprehensive documentation and teaching guidelines.
MERTEL SCRIBE £52.13 8k	mer	Full random access. Up to 255 pages in one document. 80 column editing. See it as you print it. Own universal printer driver included.
PENDOWN £39.10 16k	log	A "what you see is what you get" word processor, designed for use in primary schools. Features scratchpad utility for planning your text. Comes with disc containing a dictionary, a range of font styles and a font editor.
ROMSPELL £28.75 16k	wat	Takes text files and checks them against the 30,000 word system dictionary and a user defined dictionary.
TITAN £95.00 16k	mer	Integrated wordprocessor spelling checker database, statistics and graphics. Includes disc. Master only.
VIEW 2.1 £59.80 16k	aco	An award-winning word processor with advanced facilities designed to help both the professional user and the beginner to create high quality documents.
VIEW 3 £89.70 16k	aco	Specially designed for use with the BBC Micro B+. This package contains a comprehensive user guide and the Printer Driver Generator program on both disc and cassette.
WORD AID £23.00 16k	wat	Powerful extension ROM for Wordwise Plus. Adds a host of extra utilities via new menu of options. Powerful and simple in use.

WORDWISE £40.00 8k	cco	Popular word processor for the BBC Micro. It gives the user total control over text entered into the machine. The more complex operations are menu driven. Wordwise works with all filing systems and with any BBC Micro compatible printer without needing printer drivers.
WORDWISE PLUS £49.00 16k	cco	An enhanced version of Wordwise. It still has Wordwise at its core but the existing features have been enhanced with new embedded commands and so on. The major change is the addition of a full programming language which allows the user to add any features he needs.

Miscellaneous Utilities

DDFS FULL KIT £54.00 16k	wat	Features include commands of standard WE DFS, but with DDFS capability, giving 80 per cent increase in storage. Extremely powerful 8271 emulation.
DDFS PLUS £34.50 32k	wat	Extended version of the WE DDFS. Now incorporates many Acorn 1770 DFS commands, with even more extensions to follow.
DFS-AID £16.52 8k	lin	General purpose disc management package.
DOUBLE DOS £45.00 16k	mer	Double density DOS for BBC+. Standard BBC DFS compatible. Gives 720k in one file. 159 files in one directory. Ideal for large databases.
DUMPMASTER £27.00 16k	bbs	Provides fast machine code dumps using up to eight shades and will accurately copy your screen in any of the graphics modes and even in the teletext mode. It also includes a special 'snapshot' facility to produce screen dumps from a game, or any other program, at the press of a key (unless protected). Compatible with most printers suitable for the BBC Micro.
DUMP OUT 3 £28.75 8k	wat	Takes an image from the screen and produces a copy on the printer. Various actions can be performed, including positioning, scaling and rotating.
EPSON NLQ £28.75 8k	wat	Advanced printer utility ROM that makes a standard RX or FX printer print in NLQ (near letter quality).
GXR £29.90 16k	aco	Extends the standard PLOT and VDU calls to provide circle plotting, ellipses, parallelograms, dotted and dot-dash patterns, shading patterns, colour fill, shade fill and sprites and includes a built-in sprite designer.
HELP ROM £27.00 16k	bbs	Provides comprehensive on screen information to aid programming. Contains 28,000 characters of text to help you when you get stuck for a command or its syntax. For a piece of information simply type, for example, *H Print, *H OPT or *H FX.
ICON MASTER £29.60 16k	bbs	Automates the creation of an icon-driven user interface. It allows you to design a screen containing icons and then use it in your own programs in place of a normal menu. May optionally be controlled with the AMX mouse. Icons (sample sets provided) are designed on a special screen editor and are compatible with AMX icons.
LBO £19.95 8k	gem	Life and business organiser, featuring diary and appointment scheduler, notebook, reminders, month and week planner, search facility, user-defined categories and built-in calendar.
DATASTAG £49.95 8k	mer	Statistics and graphics. Uses data from Mertec Database. Very powerful stats plus full range of graphics. Up to four graphs on one screen.

MUROM £27.80 8k	bbs	Create your own tunes and sound sequences either with Murom's editor and a musical score or by using the BBC Micro to simulate a piano keyboard. Edit your own creations with the full screen music editor. Then switch to the envelope editor to tailor the tonal quality and select instrument type. Alternatively select one of the predefined instrument envelopes.
NLQ DESIGNER £28.75 8k	wat	Advanced font editor and designer for the NLQ fonts for the KP810 and GLP NLQ printers. Specify GLP or KP810 printer.
NOVACAD £90.85 16k	tec	Computer aided 2D drafting package. Powerful icon creating facility allows drawings with up to 500 lines to be converted into icons. Single drawing can have up to eight levels, display on each level can be configured independently. Horizontal and vertical scaling. High level zoom. Printer routine for Epson printers. Optional versions for use with AMX Mouse and Tracker Ball. Plotter driver generator available as separate package. B+ and 6502 second processor compatible.
PAGEMAKER £49.95 8k	ams	Produce your own newspapers, posters and leaflets with this complete graphics design system and word processor rolled into one. Two ROMs, two discs and an extensive manual.
PROTECTOR 24.95 8k	gem	Designed to make confidential disc data secure and unavailable to those without the required password.
REPLAY £35.00 8k	vin	Tape to disc transfer utility. Dumps whole of 32k memory once activated by a hardware switch. Also allows screen print out for games. ROM connected to PCB and three connection points in the computer. No soldering. (All hardware supplied.)
ROMIT £29.60 16k	bbs	A RAM filing system providing over 20 new commands which enable you to create a silicon disc with its own filing system commands; put your own Basic or assembler programs (or any files) into RAM and then make them into Eproms; use your sideways RAM as a printer buffer so that you can continue to use your computer for other work at the same time as printing long documents.
SCRIBECHEC £24.95 16k	mer	Spelling checker for Scribe, View and Wordwise. No limit on document length. ROM and RAM dictionary. Speed 3,000 wpm for Scribe, 1,500 wpm others.
SECURITY £9.95 8k	sof	This sits in the machine and displays your name and address and other personal details on power-up. If required a coded entry to the computer can be programmed in.
SJ CONTROL £45.00 8k	com	Adds extra Basic keywords to control all the BBC Micro's ports. Includes built-in RS423 terminal emulator. Output configurations are single or multiple bit, set high, low or unchanged, toggled or user-defined.
SPELLCHECK III £31.30 16k	bbs	Provides an automatic spelling check for letters and documents produced on Wordwise and View. It is supplied on 16k ROM (including about 2,000 words) with an accompanying dictionary disc containing an additional 6,000 words. This dictionary automatically accepts new words as you use it.
TRANSFEROM £28.75 8k	wat	For transferring games from tape to disc utilising sophisticated copying techniques.
U2 UTILITY ROM £32.20 8k	kmc	For use with Acorn 6502 and Z80 second processors, the U2 gives up to 28k printer buffer, executes input/output code from Tube, can turn off Mode 7 interface, identifies and kills ROMs, facilitates fast data transfer between processors (64k per second) and has an easy screen save for 6502.

VIEWPLOT £29.95 8k	aco	ViewPlot enables you to produce excellent line graphs to illustrate sales figures, for example. You could use the program to draw pie charts to demonstrate the voting breakdown in a local election, or bar charts to display the resources used on different projects.
DFS ROM £18.40 16k	wat	An alternative to the Acorn DFS, the Watford Electronic's DFS offers many useful features over and above the Acorn DFS, and yet retains full compatibility with the Acorn DFS.
WORDEASE £25.20 32k	bbs	Aims to streamline word processing on Wordwise Plus. It provides a number of new applications, such as mail merging and label printing, and some handy programming utilities such as a program compactor and variable display. It also allows you to easily move around segment and text areas at the touch of a key.

Languages

ACCELERATOR £56.00 16k+8k	cco	A comprehensive BBC Basic compiler, it can compile almost any Basic program. It gives full floating point arithmetic. Most programs not only run faster, but are more compact. Faster but larger machine code programs can be produced from many programs, with certain limitations such as only integer arithmetic. (2 ROMs).
BCPL £59.80 16k	aco	A flexible structured language that is easy to learn. It is particularly good at handling input and output, and is often used to write utility programs.
COMAL £49.85 16k	aco	A general purpose language which has been chosen as the educational standard in many European countries. It includes a number of features which encourage well-structured programming and facilitate debugging and maintenance of software. A comprehensive user guide is supplied.
FORTH £49.85 16k	aco	A complete implementation of the language to the 1979 specification. It is a compiled language so programs run very fast. The pack includes a tape or disc with a Forth dictionary and compiler.
ISO-PASCAL £69.00 32k	aco	A full implementation of Pascal to the ISO standard, with extensions to take advantage of the BBC Micro's special facilities (sound, graphics and so on). A disc is supplied with an extended compiler to take full advantage of a 6502 Second Processor if fitted. (2 ROMs.)
LISP £49.85 16k	aco	The fundamental language of artificial intelligence research it offers more flexibility in data and control structures than traditional languages. The system contains a number of extensions to basic Lisp.
LOGO £69.00 32k	aco	A full implementation of Logo, containing all the standard turtle graphics techniques and list processing functions. Additional features include changeable screen mode allowing multi-colour graphics, sound commands for four-part harmonies, multiple screen turtles which can be independently controlled, split and variable sized graphics and text windows. (2 ROMs.)
LOGO £69.10 16k	log	A full implementation featuring full-screen editor, and fully extensible at machine code level. Optional extras include a hardware sprite board with 32 sprites, and an advanced Logo disc including a control Logo extension.
LOGO £40.00 16k	los	A full implementation of Logo. Includes two toolkit discs containing applications, interfaces and extensions. Runs in sideways RAM.

MICRO-PROLOG £79.95 16k	aco	Designed to emphasise human logic rather than machine procedure and to put artificial intelligence techniques within the grasp of the micro user. The language readily lends itself to relational database, expert system, and problem-solving applications. Contains a version of the interpreter to take full advantage of a 6502 Second Processor if fitted.
MICROTEXT PLUS £253.00 16k	aco	A frame-based authoring package developed by the National Physical Laboratory. The system that enables interactive computer applications to be developed by users with little or no previous programming experience.
MULTI-BASIC £34.00 8k	cms	A comprehensive control language. It allows BBC Basic users to write and run event driven multi-tasking programs. It extends Basic making control programs, shorter, simpler, and more readable. It is fully multi-tasking with up to eight background tasks running concurrent with the main program. There is no interference with normal Basic functions.
MULTI-FORTH £46.00 16k	sky	Based on the Forth 83 standard, features multi-tasking operating system, 6502 assembler, screen editor and unique stack display utility.
OPEN LOGO £69.95 32k	bbc	Full implementation of Logo, written by the Open University complete with 120pp tutorial and 320pp reference manual. Tube version included in pack. (2 ROMs.)

Communications

COMMSOFT £30.00 8k	sof	Features include a direct file transfer utility and an editor for creating viewdata frames. You can prepare mailboxes off line and send using high speed send function.
COMMSTAR £33.92 8k	pac	Menu driven integrated Viewdata and Ascii communications software on ROM. Full error checking routines, programmed function keys, and manual all enhance Commstar's user friendliness. Creates an intelligent, buffered, communications terminal with storage to the current filing system thus allowing manipulation of data off-line. A comprehensive range of data parameters and communications protocols are supported.
COMMUNICATOR £60.00 16k	cco	Designed to operate as a full VT 100 terminal, allowing the home user to talk to mainframes which normally expect to talk to a VT 100. It can operate at baud rates up to 19200 baud with full handshaking. It can also be used to talk to general purpose electronic mail systems or bulletin boards.
DATABEEB £28.75 8k	mir	This ROM-based intelligent firmware gives your BBC Micro plus a suitable modem access to a range of databases and information sources such as Prestel, Viewdata, Telex and MicroLink. The package includes a user guide and function key card. Databeeb handles baud rates of 1200/1200, 1200/75, 75/1200, 300/300 and 600/600.
LE MODEM £102.38 16k	wat	Powerful and complete modem package. V21 and V23 CCITT and Bell 103/113/118 formats are supported. Auto dial and auto answer are included as standard with full software support.
TERMI II £29.00 16k	cco	Turns a BBC Micro into an easy to operate communications terminal, which can be connected to almost any other computer with a serial RS232 interface, either directly or via a modem. It allows files to be transmitted or received to and from disc, and can send incoming data to a printer. TERMI II can be configured to act like many semi-intelligent terminals, for example VT52 or ADM3A.

TERMULATOR £34.50 16k	aco	Enables the BBC Micro to emulate a variety of industry terminals. The emulations provided are: ANS (VT100); VT52; Tektronix 4010; a 'dumb' terminal; a 'hardcopy' terminal, and a special 'BBC terminal' which enables the host's output to be sent directly to the BBC Micro's VDU drivers.

Databases

DATABASE £49.95 8k	mer	Full random access. 4,000 records. One record 96 fields, one field 900 characters. Total flexibility of search and printed output. Integrates with Scribe to produce powerful mail merge.
DATASCRIBE £69.95 16k	mer	Combines Scribe, a virtual memory wordprocessor which can edit a file up to 256 pages in length, and Database with full report facility and mailmerge.
DATAGEM £69.50 16k+8k	gem	Random access database allowing up to 5,000 records, and 62 fields. All data types accepted, with comprehensive maths functions and relational fields. Search on any combination of fields, sort, send data to 'Wordwise' and 'View', and design reports for printer. Database may be re-structured without loss of data.
FILEAID £30.43 8k	lin	Database accessible from Basic.
QUEST £24.15 16k	auc	Quest is a command driven information handling package. Designed to meet the needs of both Primary and Secondary schools, Quest allows the user to set up his own databases with up to 20 fields, edit existing databases and then to interpret them. Data can be sorted out and justified. Utilities allow data to be displayed as a bar chart or scatter diagram.
VIEWSTORE £59.80 16k	aco	A powerful, general-purpose database manager with a range of possible applications. Database information is divided into records, and records are divided into fields. Utilities supplied on an accompanying disc include a flexible report generator and a program to convert databases from the formats used by other programs (including Acornsoft Database).

Spreadsheets

INTER-SHEET £49.00 32k	cco	Includes a large range of high precision mathematical functions, and special sheet functions like SUM, MIN, MAX. It can send data directly to other Rom-Link packages, for instance, for displaying as graphs in Inter-Chart. Also data can be transferred to and from popular word processors.
ULTRACALC2 £79.50 16k	bbc	Full function spreadsheet program including lookup facilities. Will spool files to most word processors. Operates in all screen modes. Simple command language. Works on Electron.
VIEWSHEET £59.80 16k	aco	A special feature of ViewSheet is the ability to replace row and column numbers with headings, thus facilitating reference to all areas of the spreadsheet. You can print out either the entire worksheet or selected windows in special arrangements.

Addresses

aco	Acornsoft, Unit 8, Cambridge Technopark, 645 Newmarket Road, Cambridge CB5 8PD. Tel: 0223 214411
acp	Advanced Computer Products, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ Tel: 0276 76545
auc	AUCBE, Endymion Road, Hatfield, Herts. AL10 8AU. Tel: 07072 65443
bbc	BBC Publications, British Broadcasting Co., 35 Marylebone High Street, London W1M4AA. Tel: 01-580 5577
bbs	Beebugsoft, PO Box 50, St Albans, Herts. Tel: 0727 40303
bev	Bevan Technology, Gresham Chambers, 14 Lichfield Street, Wolverhampton, West Midlands WV1 1DG. Tel: 0902 23546
cms	Cambridge Microprocessor Systems, 44A Hobson Street, Cambridge CB1 1NL Tel: 0223 324141
chs	Chalice Software, 3 Merlin Way, Covingham, Swindon. Tel: 0793 615026
cla	Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich, Cheshire CW9 7DA. Tel: 0606 48511
clw	Clwyd Technics, Unit 4B, Antelope Industrial Estate, Rhydymwyn, Nr Mold, Clwyd CH7 5JH. Tel: 0352 83 751
col	Colne Robotics, Beaufort Road, East Twickenham, Middlesex TW1 2PQ. Tel: 01-892 8197/8241
com	Commotion, 241 Green Street, Enfield EN3 7SJ. Tel: 01-804 1378
cco	Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts. HP2 2EX Tel: 0442 63933
fso	FSoft, PO Box 352, Brighton BN1 3AY. Tel: 0273 736042
gem	Gemini, Gemini House, Exmouth EX8 4RS. Tel: 0395 265165
gin	Ginn and Co, Prebendal House, Parson's Fee, Aylesbury, Bucks. HP20 2QZ Tel: 0296 88411/6
kmc	Kent Micro Computers, 57 Union Street, Maidstone, Kent, ME14 1ED. Tel: 0622 52784
lin	Lincoln Microsystems, PO Box 74, Bradford BD6 3RN. Tel: 0274 604571
los	Logo Software, 316a Richmond Road, Twickenham, Middlesex TW1 2PD. Tel: 01-891 0989
log	Logotron, Ryman House, 59 Markham Street, London SW3 4ND. Tel: 01-352 1088
mer	Mertec, 33/36 Singleton Street, Swansea SA1 3QN. Tel: 0792 467980
mpw	Micro Power, Northwood House, North Street, Leeds LS7 2AA. Tel: 0532 458800
mir	Miracle Technology, St Peters Street, Ipswich IP1 1XB. Tel: 0473 216141
pac	Pace Micro Technology, Juniper View, Allerton Road, Bradford BD15 7AG. Tel: 0274 488211
sky	Skywave Software, 73 Curzon Road, Bournemouth BH1 4PW. Tel: 0202 302385
sdf	Soft Machinery, 68 Botley Road, Oxford OX2 0BU. Tel: 0865 726803
sof	Software Services, 65 South Mossley Hill Road, Allerton, Liverpool L19 9BG. Tel: 051 427 7894
sys	System, 12 Collegiate Crescent, Sheffield S10 2BA. Tel: 0742 682321
tec	Technomatic, 17 Burnley Road, London NW10 1ED. Tel: 01-208 1177
vin	Vine, Marshborough, Sandwich, Kent CT13 0PG. Tel: 0304 812276
wat	Watford Electronics, 250 High Street, Watford WD1 2AW. Tel: 0923 37774
wig	Wigmore House, 32 Savile Row, London W1X 1AG. Tel: 01-734 8826

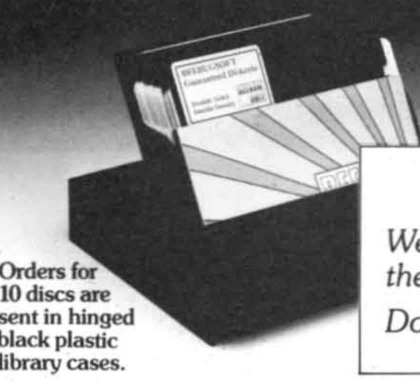
DYNAMIC DISCS

TESTED BY BEEBUG

BEEBUG, the largest independent computer user group in the UK, offer 100% tested discs supplied by one of Britain's leading disc manufacturers.

10

FREE LIBRARY CASE



Orders for 10 discs are sent in hinged black plastic library cases.

25

FREE STORAGE BOX

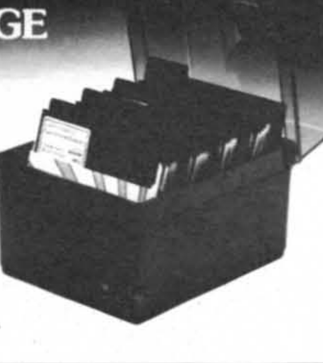
PRICES REDUCED

We are pleased to pass on a reduction in the price of Beebug discs.

Don't settle for anything less than the best.

50

FREE STORAGE BOX



Orders for 50 are delivered in strong plastic Storage box with 4 dividers.

COMPARE PRICES

4 Types of Disc To Meet Your Exact Requirement

		48 TPI			DOUBLE DENSITY		
10	S/S D/D	£13.90		10	D/S D/D	£18.90	
25	S/S D/D	£33.50		25	D/S D/D	£43.90	
50	S/S D/D	£56.90		50	D/S D/D	£77.90	
		96 TPI			DOUBLE DENSITY		
10	S/S D/D	£18.90		10	D/S D/D	£19.90	
25	S/S D/D	£43.90		25	D/S D/D	£46.20	
50	S/S D/D	£77.90		50	D/S D/D	£84.90	

All prices include Storage Box, VAT and delivery to your door (UK)

Suitable for BBC Micro and all other computers using 5¼ inch discs including Atari and Commodore.

Fully Guaranteed – Not only be Beebug but by one of the UK's top disc manufacturers.

ORDER FORM

Official orders welcome
Access/Barclaycard
24 hrs line 0494 816666
Further information
on helpline 0727 60263

Please supply me
@ £
@ £
@ £
Total cheque enc. £

Name
Address

To Beebugsoft, PO Box 109, High Wycombe, Bucks. HP10 8NP

BEEBUG SOFT

TECHNOMATIC

17 Burnley Road, London NW10 1ED Tel: 01-208 1177
305 Edgware Road, London W2 Tel: 01-723 0233

LEADING SUPPLIER TO THE BBC MARKET
ESTABLISHED OVER 15 YEARS

BBC MASTER SERIES

AMB15	BBC MASTER Foundation computer 128K	£395 (a)
AMB12	BBC MASTER ET 128K (only ANFS)	£319 (a)
AMC06	Turbo (65C102) Expansion Module	£102 (b)
ADF13	Rom Cartridge	£13 (d)
ADF10	Econet Module	£43 (c)
ADJ22	Ref. Manual Part I	£14.95 (c)
ADJ23	Ref. Manual Part II	£14.95 (c)
ADJ24	Advanced Ref. Manual	£19.50 (c)
	View 3.0 User Guide	£10 (d)
	Viewsheet User Guide	£10 (d)

UPGRADE KITS

1.2 OS ROM	£7.50 (d)
DNFS ROM	£17.50 (d)
Econet Kit	£55 (d)
1770 DFS Upgrade for Model B	£43.50 (d)
ADFS ROM (for B with 1770 DFS & B plus)	£26 (d)
64K Upgrade Kit for B plus	£35 (d)

ECONET ACCESSORIES

Econet Starter Kit	£85 (b)
Econet Socket Set	£34 (c)
File Server Level I	£75 (d)
File Server Level II	£210 (d)
Econet Bridge	£174 (b)
Printer Server Rom	£41 (d)
10 Station Lead set	£26 (c)
Adv. Econet User Guide	£10 (d)

ACORN 32016 CO-PROCESSOR

Acorn Cambridge Co-processor combines with the BBC micro to provide full 32 bit processing. The National Semiconductor 32016 processor performs all language and application processing, the NS32081 floating point processor maximises the performance and provides support for IEEE standard fp handling.

The specially developed operating system PANOS, provides efficient interfacing between the languages and the hardware and software of the BBC micro incl. the variety of ACORN filing systems: DFS, ADFS and NFS. PANOS provides a variety of utilities including a full screen editor and a linker providing acces to both library routines and cross language linking.

FORTRAN 77, PASCAL and C languages with mainframe type implementations, fully compiled and provided with appropriate library support are included. Other languages include, Cambridge LISP with its compiler, a 32016 assembler and a 32bit interpreted implementation of BBC BASIC with full screen editor. 1 Mbyte of RAM is included as standard.

32016 CO PROCESSOR (Currently available from stock) £1130 (a)

Please phone or write for full specifications on the Cambridge Co-processor and Cambridge Workstation.

WINCHESTER DRIVES

Acorn Hard Discs are now available in 10 and 30 Mbyte versions. The drive plugs into the 1 MHz bus. The ADFS filing system with its hierarchical filing structure provides excellent file management facilities. Data transfer rate of 1Mbit/sec and average seek time of 85 ms provides the user very fast access to very large amounts of data. File Server Level III is installed as standard on Acorn Winchesters. The non Acorn drive is fully compatible with the Acorn ADFS system or Torch Z80 system and offers good value for money.

Acorn 10 Mbyte Winchester	£1100 (a)
Acorn 30 Mbyte Winchester Drive	£1630 (a)
20 Mbyte Hard Disc	£1025 (a)

TECHNOLINE

PHONE
TECHNOLINE
01-450 9764
FOR DETAILED SPECS
ON THE MASTER
SERIES & UPGRADES

TECHNOLINE offers you 24 hour, 7 days a week ordering/information

***New Products *Comment Box**
***Technical Pages *Comments on Stock and availability of Products**
***Placing of Orders**

Techno-Line 01-450 9764
24 hour, 7 days a week
or 01-452 1500
(weekdays 7pm9pm,
24 hours weekends)

Technical Information:
1200/75 Baud. Standard Viewdata/Prestel Protocols.
Please note that a 'Prestel' type terminal must be used.

Please phone for our latest Educational Price List.

EPROMs/RAMS

2764-25	£2.00 (d)
27128-25	£2.50 (d)
6264LP-15	£3.40 (d)

ACORN 2nd PROCESSORS

Acorn Z80 2nd Processor: Z80 CPU with 64K of RAM housed in a separate case with a integral power supply interfaces with the BBC computer through the TUBE. It converts the BBC into a CP/M system and its comprehensive package of software provides a suitable basis to set up a business system. £329 (a)

Acorn 6502 2nd Processor: This processor provides faster data processing speeds and larger memory. Particularly useful for use with Hi View word processor for production of large documents. £162 (b)

MULTIFORM Z80 2nd PROCESSOR

This processor converts your BBC into a power CP/M system and make it capable of operating in almost any CP/M format. Full details on page 5. £299 (b)

TORCH Z80 2nd PROCESSOR

ZEP100: This Z80 processor with 64K fits internally in the BBC computer and has the operating system in a ROM. It is supplied with the PERFECT suite of software comprising of a database, wordprocessor and a spreadsheet and a BBC BASIC for Z80. £229 (a)

TZDP240: ZEP100 with TECHNOMATIC PD800P dual drive with built in monitor stand. £469 (a)

ACORN TELETEXT ADAPTOR

This adaptor will convert the BBC computer into a teletext receiver capable of decoding and displaying the CEEFAX and ORACLE pages and the monitor screen. These pages can also be saved for later reference. BBC TV transmit educational software on their CEEFAX system which can be downloaded free of charge. £125 (b)

ACORN IEEE INTERFACE

This interface enables a BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard, at a lower price than other systems, but without sacrificing any aspect of the standard. The interface can link up to 14 IEEE compatible devices. Typical applications are in experimental work in academic and industrial laboratories, with the advantage of speed, accuracy and repeatability. The interface is mains powered and comes with cables, IEEEFS ROM, and user guide. £278 (a)

ROBOCOM BITSTICK

The renowned 'BITSTICK' graphic CAD package. Using the on-screen menu and colour pallette, it can draw freehand as well as lines and shapes with great accuracy. Any part of a drawing may be magnified many times, and up to 192 drawings may be saved on a disc. In total, a friendly yet sophisticated CAD system offering tremendous value.

ROBOCOM BITSTICK I £299 (a)

ROBOCOM BITSTICK II: This package is as Bitstick 1 with software upgraded to allow scaling and auto dimensioning. Multiplotter driver is also supplied with the package. £775 (d)

Upgrade for Bitstick I to II	£415 (b)
Bitstick Multiplotter Driver (most popular plotters included)	£69 (b)
Epson FX80 Screen dump routine for Bitstick I	£35 (d)
Epson FX80 dump for Bitstick II	£39 (d)

DISC DRIVES

All drives listed below are fully compatible with single and double density DFSs.
The larger capacity referred to below is for the Acorn's ADFS system.

Your computer installation can look like this with our PD800P drive

This highly successful drive offers unique features:

New slimline Mitsubishi mechanisms with ultra low power consumption (only 8 watts per mechanism), front locking lever and capable of single or double density operation. Ultra fast track access times and head settling times.

Fully compatible with the DFS and ADFS filing systems on the new MASTER's range.

40/80 switchable with switches located on the front panel. A generously rated switch-mode power supply ensures reliability with minimum heat dissipation for long periods of operation.

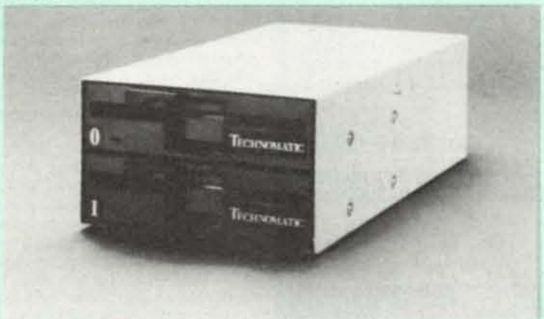
The mechanisms are set inside a sturdy monitor stand painted in 'BBC-matching' beige. Its 'looks' are enhanced by its black front panel, with attractive enamel-white markings.

These disc drives with a built-in monitor plinth provide a compact installation and give a professional look to the system.

As with all standard TECHNOMATIC drives it comes complete with a data cable, and a mains lead with a suitably fused 13A moulded plug.

PD800P 2×400K/2×640K 40/80T DS **£260 (a)**

PD800



TECHNOMATIC's stacked drives are housed in smart metal casings painted in BBC beige colour and are built to the same exacting standards as PD800P drives. The drives are fitted with integral switch mode power supply and supplied with a mains lead with a suitably fused 13A moulded plug and a data lead.

These drives are fitted with the new model MITSUBISHI mechanisms, which have been specially adapted for us to fit the 40/80 track switches on the front panel of the mechanisms. This would mean that the user no longer needs to grope at the rear of the drive to set the correct track setting.

PD800 (2 × 400K/2 × 640K 40/80T DS) **£240 (a)**

TD800 (as PD800 but without the psu) **£225 (a)**

TECHNOMATIC's single drives are also housed in metal casings painted in BBC beige colour and are offered with or without power supply. All drives are supplied with data cables and suitable power leads. Mains powered drives have a lead suitably fused with a 13A moulded plug.

1 × 400K/1 × 640K 40/80T DS

TS400 £109 (b) **PS400** with psu **£129 (b)**

3.5" DRIVES

These compact drives, used with most of the new 16 bit micros offer fast access times and high performance with minimum of power consumption. The mechanisms are 80 track double sided and are capable of both single and double density operation. The single drive is offered in a dual case with a blanking plate for future upgrading. The drives are offered with or without integral mains power supply and they are supplied with all the necessary cables to make them ready for connection to a computer. Mains powered drives are supplied with a lead with suitably fused 13A moulded plug.

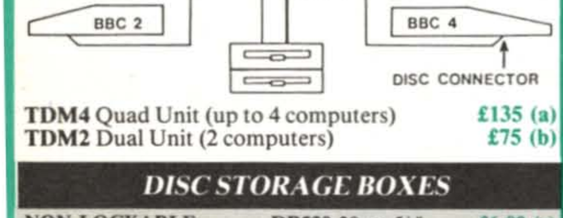
1 × 400K/1 × 640K 80T DS : **TS35 1** £109 (b); **PS35 1** with psu £124 (b)

2 × 400K/1 × 640K 80T DS : **TD35 2** £199 (b); **PD35 2** with psu £219 (b)

TD35 2

DISC DRIVE MULTIPLEXER

The cost-effective alternative to networking! A self-contained unit that enables up to four computers to be connected to one single or dual disc drive. No hardware modifications — simply plugs into the computers disc interface connectors. No ROMs or other software needed. All DFS commands work as normal. The switching of drives between computers is totally automatic and completely invisible to the user. This unit is ideal for installing in classrooms and other situations, where networking is not planned or necessary, or where costs must be kept low. In many cases software needs to be shared, although full networking complexity and cost is not needed. Several of these units can be connected in series to allow more computers to access the same discs, i.e. two quads connected together will allow 7 computers to share 1 drive. Units are supplied with 5' of cable per outlet as standard. Mains powered.



TDM4 Quad Unit (up to 4 computers)	£135 (a)
TDM2 Dual Unit (2 computers)	£75 (b)

DISC STORAGE BOXES

NON LOCKABLE	**DB530** 30 × 5¼"	£6.00 (c)
LOCKABLE	**DB340** 40 × 3½"	£8.50 (c)
DB550 50 × 5¼" £9.50	**DB570** 70 × 5¼"	£11.00 (c)
	DB5100 100 × 5¼"	£13.00 6b)

3M 5¼" FLOPPY DISCS

40 T SS DD	£10.50
40 T DS DD	£12.75
80 T SS DD	£14.75
80 T DS DD	£16.00

(£1 extra for library case packing)

FREE SWISS ARMY KNIFE for every three packs of discs.

3M 3½" FLOPPY DISCS

80 T SS DD £18 (d) 40 T DS DD £25 (d)

Discs in packs of ten

Available at the new greatly reduced prices (for limited period only)

SPECIAL BULK DEAL

High quality **5.25"** with our usual lifetime warranty. The discs are packaged in a lockable plastic box.

50 Single Sided 40 track Double Density	£42.50 (b)
50 Double Sided 40 track Double Density	£55.00 (b)
50 Double Sided 80 track Double Density	£65.00 (b)

DRIVEHEAD CLEANING KIT

The **FLOPPICLENE** drive head cleaning kit is an ideal way to ensure the optimum performance of your drives. The use of disposable cleaning discs eliminates the risk of contamination and abrasion of sensitive driveheads. These risks are normally inherent in the reusable drivehead cleaning kits. 5¼" £14.50 (d)

Floppiclene with 20 disposable cleaning kits. 3½" £16.00 (d)

TECHNOMATIC

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
Telex: 922800
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Access Card

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

EPSON PRINTERS

LX80 £195 (a)	**Tractor Feed** £20 (c)
FX85 £315 (a)	**FX 105** £449 (a)

A limited no of FX80s available at £260 each.

LQ Range: This range with 24 pin dot matrix printers offers a high, 200 cps, draft speed and superb correspondence quality print at 67 cps and truly high resolution graphics and a variety of fonts.

LQ800 £495 (a)	**LQ1000** £729 (a)

TAXAN PRINTERS

KP810 (80 col)	£230 (a)
KP910 (156 col)	£379 (a)

NEW
JUKI 5510 PRINTER

A new dot matrix printer from the reliable JUKI stable. Features include a fast 180 cps. NLQ at 40 cps. Full EPSON/IBM compatibility. 3K buffer as standard expandable to 15K. Full graphics capability and a variety of fonts including international characters set. Can be upgraded to a seven colour printer. Sheet feeder available as optional extra. £229 (a)

COLOUR PRINTERS

EPSON JX80 4 colour.	£420 (a)
Integrex Colour Jet Printer.	£549 (a)
Canon PJ1080A	£369 (a)
JUKI 5510 colour upgrade.	£99 (b)

CENTRONICS GLP

A NLQ printer at an affordable price. Fully compatible with Epson control codes offering a variety of fonts including super and subscripts, and a variety of graphic modes. Serial and parallel interfaces fitted as standard. Friction feed as standard. £109 (b) Tractor feed £14 (d)

DAISY WHEEL PRINTERS

BROTHER HR15: * 14 cps * 3 K Buffer * Two colour printing * Proportional spacing * Underline * Bold * Shadow print * Super/Sub script + many other features.

BROTHER HR15 £315 (a)

JUKI 6100: * 15 cps * 2K Buffer * Switchable 10/12/15 cpi * Proportional printing * Linear Motor for maximum reliability.

JUKI 6100 £249 (a)

DOTPRINT PLUS

The most versatile NLQ rom for the BBC Micro. DOT PRINT PLUS not only gives you the 10 character pitch at 6 lines/in with underlined and double width characters as required but unlike all other NLQ roms, it offers a lot more.

- a built in CHARACTER FONT EDITOR enables disc users to create their own type faces for using in printing spooled text files.
- a built in View Printer Driver.
- MICROSPACING for professional justification in VIEW and — with discs — in WORDWISE/PLUS.
- true BOLD PRINT in addition to double width.
- 12 char pitch as standard — providing 96 CHARACTERS PER LINE on the FX/RX 80 for example.
- simple control codes allow VARIABLE PITCH LINE SPACING in 1/72" increments and VARIABLE PITCH from 12 cpi in increments of 1/240". (10 cpi can be selected by a single control code).

Suitable for use with printers fully compatible with EPSON quad density graphics.

DOTPRINT PLUS for FX/RX and compatibles.	£28 (d)
DOTPRINT Dual for MX Range.	£28 (d)

PRINTER BUFFER & SHARERS

BUFFALO 32K Buffer for EPSON PRINTERS: This compact 32K buffer can be fitted internally on most EPSON printers within a few minutes. It does not require external power or any modification to the printer. It will hold about 15 A4 pages of text freeing your computer for other jobs in a fraction of the time it would normally have to wait for the printer to finish all that printing. Supplied with full fitting instructions.

Buffalo 32K Buffer £75 (d)

PRINTER SHARER/BUFFER: A unique sharer/buffer that provides a simple solution to improve system utilisation. It can be connected to up to three computers and it will automatically switch between the computers to scan for data — no manual switching required. High speed data input rate to the buffer cuts down the normal waiting time for the computers for the printing operation to complete and thus allowing the computers to be used for other uses. The 64K buffer would hold over 30 A4 pages of text.

Facilities include: COPY, PAUSE AND RESET. LED indication for percentage of memory available and data source. Mains powered. Send for detailed specification.

Available in 64K and 256K versions

TSB 64 £199 (b)	**TSB 256** £275 (b)

A Serial Buffer/Sharer will soon be available. Please send for details.

PERIPHERAL & COMPUTER SHARERS

An extended range of peripheral sharers to allow the user to switch between computers, printers and modems. High quality switching mechanisms housed in fully shielded metal cases ensure reliability. No external power input required.

All lines on the sharers are fully switched (36 on parallel and 25 on serial)

	Parallel	Serial
3 Computers to a Printer	36V36-3 £69(c)	25V25-3 £64(c)
4 Computers to a Printer	36V36-4 £85(c)	25V25-4 £74(c)
2 Computers/2 Printers x-over	36V36-X £69(c)	25V25-X £69(c)
BBC Cable Set 3 to 1 (1m ea).	£32(c)	£34(c)
BBC Cable Set 4 to 1 (1m ea).	£39(c)	£41(c)

BBC Computer Sharer: TCS26:
1 computer to 2 printers
fitted with Cable. £19.50 (c)

EPSON HI-80 PLOTTER

EPSON technology has once again scored a first by introducing a sophisticated A4 size plotter that does not need specialised software or programming skills to operate it and yet keep the cost within the reaches of all computer users. Features include 4 pens at a time — upto 10 colours to choose from, a variety of pen nibs, high speed plotting. Powerful software command codes include single commands to plot circles, eclipses or triangles. Line or bar graphs and pie charts can be plotted in a variety of exciting styles very simply by keying in the data into the computer.

Detailed leaflet on request.

Epson HI-80 Plotter £325 (a)

HITACHI 672 PLOTTER

A high speed, compact A3 plotter with 4 colours and high accuracy. Both serial and parallel ports as std. Plots on either OHP film or plain paper. Operates on HP GL or single character commands and is easy to interface to most graphics software. £465 (a)

GRAPHICS PLOTTER

Available again with considerable enhancements to the original model. Plotting area has been increased to A3 size with a resolution of 0.1mm. Opto sensor converts the plotter into an input device to scan and digitise pictures, traverse mazes and investigate methods of artificial intelligence. A more powerful drill/router attachment and scriber provide facilities for drilling on various materials and fine line drawing on coated materials.

Total cost: £629 (a)

Basic plotter and accessories available separately. Send for details.

PLOTMATE

From Linear Graphics a range of fast, accurate and easy to use plotters.

The A4 Plotmate is the ideal drawing companion for all BBC micros, the Master and Cambridge Work Station. Plugs into the user port or printer port of your BBC Micro and directly driven by the BBC graphics commands in BBC Basic, Logo or indeed any high level language without additional driver software.

Plots onto paper, card or acetate film in up to 6 colours using fibre, OHT or ballpoint pens.

A4 Plotmate £299 (a)

A4M and the new A3M models plug into BBC and all leading micros. They run on a wide range of Linear Graphics and third party software. Numerous functions and add-on capabilities ideally suited to the requirements of the Education, Industry and Business environments including mathematical modelling, data display, CAD, mapping, optical scanning and PCB design.

A4M £399 (a)	**A3M** £549 (a)

PRINTER ACCESSORIES

EPSON ACCESSORIES:

Interfaces:

8143 RS232	£28 (d)
8148 + RS232 + 8K	£75 (d)
8165 IEEE + Cable	£65 (d)
8148 RS232 + 2K	£57 (d)
8132 Apple II	£60 (d)
8177P NLQ for FX80 + /FX100 +	£99 (d)

Parallel & Serial Buffers of various size also available.

FX80/80 + /85 Tractor Attachment	£37 (c)
FX80/80 + Paper Roll Holder	£17 (c)
LX80 Tractor Feed	£20 (c)
LQ800 Tractor Feed	£44 (b)

SHEET FEEDERS:

8338 LX80	£49 (b)
8333 FX100 + /105	£169 (a)
8331 FX80 + /85	£129 (b)
8330 RX80 +	£129 (b)
LQ800	£129 (b)

Ribbons:

RX/FX100/100 + . FX105	£10 (d)
RX/FX80/80 + , FX85	£5 (d)
LX80	£4.50 (d)
H180 Pen Set (Aqueous/Ball point)	£7.50 (d)

Dust Covers:

FX80	£5.50 (d)
TAXAN/Canon KP810	£6 (d)
FX100 £7.50 (d) **KP910**	£7 (d)

TAXAN CANON Accessories:

RS232 + 2K buffer	£78 (d)
Ribbon	£6 (d)

JUKI 6100

RS232 Interfaces	£65 (d)
Tractor Feed	£129 (a)
Ribbon (Carbon)	£2.00 (d)
Spare Daisy Wheel	£14 (d)
Sheet Feeder	£182 (a)

BROTHER HR15

Daisy Wheel	£18 (d)
Tractor Feed	£90 (a)
Ribbon (Carbon/Nylon)	£3.00 (d)
Sheet Feeder	£182 (d)
Keyboard	£135 (a)

Printer Leads:

BBC Parallel Lead (1.2m)	£6 (d)
BBC Serial Lead (1.2m)	£6 (d)

Other lengths can be supplied on order:

IBM Parallel Lead (2m)	£12 (d)

PAPER & LABELS

Plain Fanfold paper with micro perforations:

2000 sheets 9½" × 11"	£13 (b)
2000 sheets 14½" × 11"	£18.50 (£4.50)

Labels/1000:

Single Row 3½ × 1 7/16"	£5.25 (d)
Triple Row 27/16" × 17/16"	£5 (d)

MULTIFORM Z80

The MULTIFORM Z80 2nd Processor for the BBC Micro — opens the horizons of CP/M software to the BBC micro user

- Will enable running of almost any CP/M applications software
- Will enable transfer of data between different disc formats
- Emulates the two terminals most frequently used by CP/M software

MULTIFORM Z80 interfaces directly to a normal BBC micro requiring no hardware changes. It is supplied with OS/M operating system in rom which can run all software that obeys CP/M 2.2 constraints and its configuration is not hardware specific.

MULTIFORM Z80 is truly flexible and can be used with any BBC micro drive system, single or dual drive, 40 or 80 track format and single or double sided. Unlike other currently available Z80 processors for the BBC micro, there are absolutely no restrictions on the type of drive that can be used with the MULTIFORM Z80.

MULTIFORM Z80 plugs into the 1MHz bus connector of the BBC micro. It is mains powered and does not put any extra load on the BBC's psu. The data cable can be several feet in length, allowing convenient siting of the MULTIFORM Z80, unlike present second processors, which have 8" cables.

Twenty eight CP/M formats are supplied which include: Acorn Z80, RML 380Z and 480Z, Torch (read only), Osborne, Televideo . . . we also offer to configure other formats at an extra charge."
Rom based OS/M operating system is fully compatible with Acorn's single and double density disc interfaces. Installing the OS in rom allows more space on discs for programs and data and response to system commands is very fast. (Note: Single density DFS will only read/write to single density CP/M formats).

MULTIFORM Z80 can format, read or write from a very wide range of CP/M disc formats. On a dual drive system, the drives can be set up independently to run two different formats at the same time. This will enable:

- The user to buy software from a very wide range of suppliers without having to worry about the type of format supplied.
- Interchange of valuable data and files among users of various CP/M computers.
- Using a system at home for preparing data required in the office.
- Software writers/developers to write software in any one format and transfer it to any other format without having to pay for expensive porting charges.

MULTIFORM Z80 is supplied with a library of a number of popular CP/M formats and a utility disc containing a program for creating files for the additional formats. Each library can load 32 formats and there are no restrictions on the number of librarires that can be created.

The utility disc also contains a program to interconvert ASCII texts wordprocessed on a normal BBC and under OS/M or CP/M.

MULTIFORM Z80's terminal emulation includes the ADM-3A, the HAZELTINE 1500 and the BBC VDU making the installation of most of the well known CP/M software easy.

MULTIFORM Z80 converts your BBC computer into an almost universal CP/M machine and adds the power of being able to run two different formats simultaneously, which currently is possile on only the very sophisticated specialist machines.

For any one working or intending to work in a CP/M environment, MULTIFORM Z80 is an indispensable tool.

In offices where there are a multitude of CP/M machines and a few BBCs, MULTIFORM Z80 will prove to be invaluable for transferring data between the various CP/M machines.

MULTIFORM Z80 (including utility disc, library disc and manual) **£299 + £4 p&p**

(When ordering please specify the type of DFS, MULTIFORM Z80 will be used with)

SPECIAL MULTIFORM UTILITY to read and write to IBM PC Disc. **£49 (d)**

CP/M SOFTWARE FOR TORCH & ACORN Z80 PROCESSORS

We can now supply almost any CP/M based software package in a format suitable for the Torch Z80 and Acorn Z80 second processors. Phone for details on prices for popular packages for IBM

Please phone for our new professional software catalogue

WORDSTAR PROFESSIONAL The advanced word processing package comprising of WordStar, MailMerge, StarIndex and SpellStar, a total combination offering substantial savings on individual prices. WordStar is the best selling word processing program on the market. Extensive operator aids include a comprehensive friendly manual, step-by-step training guide, command cards, on-screen menus. Spellstar checks text files against its 20,000 word-plus dictionary. You can both add to the dictionary and create specific supplementary ones. Mailmerge is ideal for mailing applications. It enables the fast production of personalised form letters, mailing labels, invoices, etc. StarIndex creates alphabetical indexes, tables of contents, paragraph numbering etc.

WORDSTAR PROFESSIONAL £310 (a)
WORDSTAR £275 (a) WORDSTAR Upgrade to W/S Prof £195 (a)

DBASE-II Undoubtedly 'The Database', can be used for an almost limitless number of business applications, ranging from mailing list preparation through to running accounting ledgers and payrolls. An on-disc tutorial takes you from setting up a simple file all the way through to setting up custom screens and reports. Automatic calculations may be performed on data. Fields or entire databases may be modified or replaced with single, English-like basic commands; Dbase-II can therefore be used by general personnel having no programming knowledge. It can be tailored to suit a variety of professions and individual needs, with files such as accounting, payroll, time billing, job costing, scheduling and mailing lists. It can access several files at a time. It is fast, flexible and powerful. **£310 (a)**

SAGE ACCOUNTS: This package has been designed for the smaller business, for the user who is unfamiliar with computers but wanting or needing to computerise the bookkeeping and accounting functions. Sage is easy-to-learn and easy-to-use and is complete with a full tutorial booklet and a free manufacturers 90-day 'Hot-Line' support. It is a truly integrated package (all on one disc!) and covers Sales, Purchase & Nominal Ledgers, with a capability of handling up to 999 accounts per ledger. It will handle all your Sales and Purchase invoices and can easily generate account & management reports. £375 **Sage plus** (£695) for the larger business, and **Sage Payroll** (£195)

Other packages available include PRO-PASCAL, CIS-COBOL, Supercalc II, MACRO-80 etc. Please telephone with your requirements.

A.T.I. Trainers — these superb interactive training discs simulate the package being studied. A unique screen technique provides a friendly interaction — in the upper area, a faithful reproduction of the screen is displayed, while at the bottom, a series of prompts and explanations lead the student through the exercise. ATI trainers available include Wordstar, dBase-II, dBase-III, Multimate, Multiplan, Word at £75 (b). Please phone for other trainers.

TORCH GRADUATE IBM SOFTWARE: We are able to supply most popular software packages including: WORDSTAR, WORD, EASY-WRITER, DBase-II & III, LOTUS-123, VISICALC, SAGE etc. Please telephone with your requirements.

PROFESSIONAL SOFTWARE PUBLICATIONS

Wordstar made easy	£16.95 (c)
Introduction to Wordstar	£17.95 (c)
Wordstar Handbook	£11.95 (c)
dBase-II for the first time user	£16.95 (c)
Understanding dBase-II	£22.95 (c)
Understanding dBase-III	£22.95 (c)
Multiplan Made Easy	£18.95 (c)
Multimate Complete Guide	£16.95 (c)
ABC of LOTUS 123	£15.95 (c)
The RS232 Solution	£17.95 (c)
CP/M Bible	£15.95 (c)
Soul of CP/M	£14.95 (c)
CP/M Handbook	£14.95 (c)
Mastering the CP/M	£17.95 (c)
Computer Spreadsheets	£7 (d)

(no VAT on books)

TECHNOMATIC

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
Telex: 922800
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Access Card

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

MONITORS

(All Monitors supplied with BBC Lead)

RGB MONITORS

1431 14″ RGB Std Res	452 × 585 pixels	£179 (a)
1451 14″ RGB Med Res	653 × 585 pixels	£229 (a)
1441 14″ RGB Hi Res	895 × 585 pixels	£375 (a)

MICROVITEC 14″ RGB/PAL/Audio

1431AP 14″ Std Res	452 × 585 pixels	£199 (a)
1451AP 14″ Std Res	653 × 585 pixels	£275 (a)

The above monitors are available in plastic or metal case.

MICROVITEC 20″ RGB/PAL/Audio

2030CS 20″ Std Res £380 (a) **2040CS** 20″ Hi Res £685 (a)

TAXAN 12″ RGB

K12SV3: A high performance high res monitor with desk matt screen with options to switch to monochrome green/amber. IBM Compatible £324 (a)

MITSUBISHI XC1404 14″ Med Res RGB:
BBC/IBM Compatible. A new monitor with etched dark screen with both brilliance and contrast controls giving sharp graphics and text display. £219 (a)

MONOCHROME MONITORS

TAXAN

KX1201G 12″ HI-RES green etched screen	£90 (a)
KX1203A 12″ HI-RES amber etched screen	£105 (a)

PHILIPS

BM7502 12″ HI-RES green screen	£75 (a)
BM7522 12″ HI-RES amber screen	£79 (a)

ACCESSORIES

Microvitec Swivel Base (14″ plastic monitors)			£20 (c)
Taxan Swivel Base for mono monitors with integral clock			£22 (c)
Philips Swivel Base			£14 (c)
Monitor Stand. BBC B + B	£10 (c)	Master	£12.50 (c)
Double Tier Plinth. BBC B + B			£19.50 (b)
Taxan RGB Cable	£5 (d)	Microvitec RGB Cable	£3.50 (d)
Monochrome BNC/PHONO Cable			£3.50 (d)

TOUCHTEC-501

Designed for use with Microvitec metal cased monitors, and using the RS-423 socket, this unit brings genuine touch-screen operation to your BBC. Ideal for the educational users. Supplied with a users handbook and utilities disc containing starter programs and development software.

Touchtec 501 £255 (b)

EPROMER II

EPROMER II
EPROM PROGRAMMER
FOR
THE BBC MICRO
TECHNOMATIC LTD.

A sophisticated eprom programmer that handles the full range of popular single rail eproms (incl 27256) and allows the user full control of the programming process.

Its powerful menu driven software makes the programming of eproms simple, efficient and eliminates the need to have fiddly switches for selecting eprom types, programming voltage or method. The features include:

- Integral power supply ensures no power drain from the computer.
- Interfaces through 1 MHz bus, fully buffered.
- Clear and simple instructions displayed on the screen make the programming easy for both the first time user and the advanced user.
- Eproms upto 16K (27128) programmed in single pass (27256 in two passes).
- Selectable programming voltage 25/21/12.5V
- Selectable programming method — normal or high speed algorithmic. High speed programming enables 27128 to be programmed in just over 2 mins. Normal programming skips addresses with FF data to increase programming speed. Automatic verification on completion of programming.
- User can select any section of the eprom from a single byte to its full address range to Blank Check/Read/Program/Verify enabling program development/changes very simple.
- Full screen editor with HEX/ASCII input.
- Data input from keyboard/Tape/Disc/Eprom.
- Software interface for integration of user's special requirements.
- Constant display of all options selected.
- Several BBC BASIC programs can be entered on a single eprom.
- Checksum facility allows for easy identification of programmed roms.
- Enter OS Commands from within the epromer program.

EPROMER II with Manual & Software on disc	£99 (b)
ROM image of software supplied on disc for use with sideways ram. ROM based software if required.	£5 (d)

UV ERASERS

UV1T Eraser with built-in timer and mains indicator. Built-in safety interlock to avoid accidental exposure to the harmful UV rays. It can handle up to 5 eproms at a time with an average erasing time of about 20 mins. £59 (b)

UV1B as above but without the timer. £47 (b)

PORTAL ROM EMULATOR

NEW

Real time evaluation of all listed eproms at 150 ns — hundreds of times faster than a typical eprom write/erase cycle (4Kbytes/sec, no erase time) — completely software driven (by Meta Assembler) — compatible with 'piggy-back' processors.

Don't blow an eprom each time you test your code on your target system! Use a PORTAL eprom emulator instead. Upto four independent PORTALS can be used on the same BBC lead. Each PORTAL has a length of cable with 28 pin header which plugs into the eprom socket you need to emulate — and thats it. All the rest is handled by META. Your code is sent down to PORTAL during assembly, with various options ie two PORTALS for 16bit data bus, sequential PORTAL skipping etc.

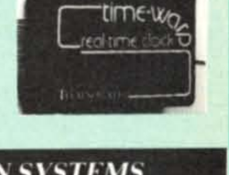
PORTAL is supplied in a custom steel case with 13 LEDs to indicate the state of its various functions. Comprehensive documentation and software are included.

Two versions of PORTAL are currently available.

PORTAL 128 (2716/2732/2764/27128)	£185 (b)
PORTAL 512 (all above + 27256 and 27512)	£285 (b)

Please send for detailed specification sheet

REAL-TIME CLOCK CALENDER



A low cost-unit, allowing the facilities of units costing far more. Built to professional standards, it opens up the total spectrum of Real-Time applications. Possibilities include desk diary/planner, calender, continuous display of on-screen time and date information, automatic document dating, precise timing and control in scientific applications — its uses are endless. Simply plugs into the user port — battery backup is supplied as standard. A full manual as well as extensive software including a simple demonstration diary/planner application program on disc. £29 (d)

ROM/RAM EXPANSION SYSTEMS

ATPL SIDEWISE ROM EXPANSION BOARD A well constructed expansion board, simple to instal and requires no soldering. All buses are buffered. It allows full sidewaysd rom expansion to 16 ROMs. One socket has been split into two 87K sockets to allow the use of 8K CMOS RAM. Battery backup option allows data retention in the RAM when the computer is switched off. Several link selectable options including write protect for the RAM. ATPL Board £37 (d) Battery Backup Kit £18 (d)

COMPUTER VILLAGE CV-16 Rom Board £38 (d)

A neatly designed, simple to instal board allows full sideways rom expansion on the model B. Two sockets for 8K CMOS RAM allow a total of 16K for which battery back is fitted as standard. £35 (d)

RAMROM-15 The advanced sideways ROM/RAM expansion system. This is an external unit, using high quality construction. attractively packaged in a BBC coloured metal case, allowing easy access to all the sockets. No soldering is required. Allows 11/12 additional sideways ROMs to be fitted with an option of up to 16K sideways RAM. All commonly available RAM can be used i.e. 4801/6116/6264 or xx128. Battery back-up fitted as standard. For development work and further expansion, most of the 6502 processor signals are available. Supplied with utility disc and full instruction manual. £79 (b)

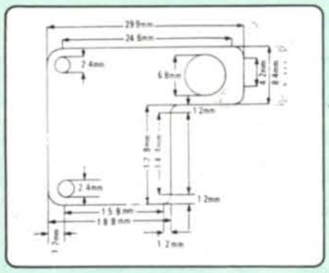
(Above boards are for use with standard BBC computer and not compatible with B plus unless specifically mentioned)

NOVACAD
Computer Aided Draughting for the BBC Micro

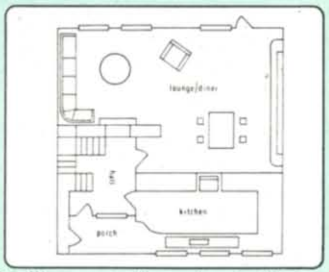
A sophisticated CAD package with unique facilities which until now were confined to custom built CAD packages.

Whether you want to draw a complex electronic circuit diagram or plan your new kitchen or simply draw a cube NOVACAD will help you do it better and more easily.

All you need is a BBC micro model B fitted with Acorn DFs and a single disc drive. If you have a 6502 2nd processor and a dual disc drive NOVACAD's capabilities are further enhanced.



- * Very user friendly with all commands and controls from the keyboard. Special windowing techniques make available to the user almost one million dots allowing a lot more detail to be put on the drawing than one would normally expect the BBC to be capable of. The drawing can be 4 windows across and 5 up.
- * Libraries of user defined ICONS such as electronic symbols can be created easily and edited even in the middle of drawing another diagram. ICON size is not limited to a number of pixels. An ICON can contain up to 500 lines, so complete drawings or sections of large drawings can be saved as ICONS for use with other drawings.
- * ICONS can be called by name from a library into any part of the diagram and can be moved, enlarged, reduced, rotated in 90° steps and have mirror images made before being finally positioned.
- * Shapes can be copied on the screen as many times as required.
- * The zoom facility allows the user to magnify any section of a drawing by up to 20 times to make it easier to insert details.
- * Horizontal and vertical displacements can be measured in any user defined scale.
- * Any two colour can be used in mode 4.
- * Up to '8 levels' can be used to produce multi layer drawings, and then user can decide which levels are to be displayed. This can be particularly used in pcb drawings, architectural drawings with details of the services behind the walls displayed only when required and many other such applications.
- * Text can be added at any position vertically or horizontally.
- * Use of 2nd processor will allow use of any 4 colours, higher pixel density drawings and considerably faster operation. (NOVACAD without the 2nd processor is faster than any other CAD package we have seen for the BBC).
- * Powerful delete facilities allow deletion of single lines or whole sections with minimum of key presses.
- * Printer dump for Epson compatible printers incorporated in the software which allows a full or a sectional screen dump.
- * An optional plotter utility contains a plotter configuration program allowing the user to configure a program for his plotter. Pre-configured programs are included for Epson HI80, Hitachi 672, Penman, Plotmate and HP GL.



NOVACAD will prove to be an invaluable teaching aid in technical schools and colleges and for anyone involved in draughting it will be an ideal labour saving tool.

NOVACAD package with 16K ROM, Utility disc and a comprehensive manual £79 (c).

Novacd compatible with Tracker Ball/AMX Mouse £99 (c)

Stand Alone Mouse for use with NOVACAD £34 (d)

Upgrading of existing ROMs and DISCS £20 (d)

Plotter Utility Program £28.50 (d)

NEW META VERSION THREE

Now Available

- * **Assembles for even more processors**
- * **Now over 70k long on 2 Roms and 2 Discs**
- * **Dozens of new options, features and directives**

The Original META system sold hundreds worldwide; it's being used in Universities, Polytechnics, British Telecom, the BBC, the MOD etc etc.

Now there's an even better version. It is supplied on two 16K roms and two discs and it is fully compatible with all BBC models including Master and gives you complete Editing and Assembly facilities for all the listed processors:

1802
HD 64180
Z80
6502 (including *all* CMOS varients)
65C812
65C816
6800
6802
68HC11
68000
8048 Series
8051 Series
8080
8085
Z8
68120
68121
6808
6301
6303
6305
6801
6803
6805
6804
6809

META uses the appropriate standard mnemonics for each, eg. LD (HL), 0ABH in Z80 and MOVE. B D0, $50 (A5, D6.L) in 68000 etc.

Full nestable Macro facilities are provided, and nestable conditional Assembly, (IF/ELSE/ENDIF), Modular source code (including parameter passing). True local and global labels, 32 bit labels and arithmatic (incl. MUL, DIV, AND, OR, XOR, SHL etc). 30 ways to send object code during Assembly, including Intel Hex, S.Record, Binary etc to Disc files, RS423, EPROM emulators etc, local reassembly and over 50 directives, including DS.X, DC.X, EQUX, FCB etc).

Wordwise-style Editor integrated in with Assembler; Search/Search-Replace, Block copy/delete, markers etc; dozens of special features and functions for Assembly code programmer. Fast and Friendly to use.

Plus special new serial Communicator Area with Complex Option page etc.

Send for your detailed spec sheet on the META Assembler and the PORTAL EPROM Emulators. Set of disassemblers and Logic Analyser coming soon. **£145 (c)**

Please specify the computer type when ordering.

TECHNOMATIC

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
Telex: 922800
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Access Card

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

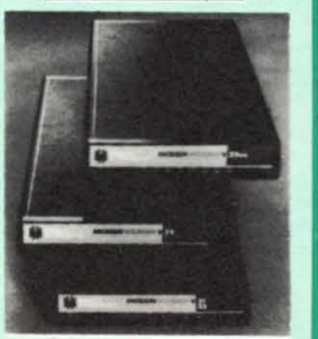
Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

COMMUNICATIONS

MIRACLE WS3000 Range: * A new, professional series of intelligent modems with full auto dial and auto answer facilities as standard. * HAYES protocols are implemented allowing the use of a wide range of well proven communications software. 'Plain English' command structure simplifies the use of the modem even for the first time user. * All models feature a centronics compatible printer port allowing direct output to a printer. * A line sharing facility that allows WS3000 to differentiate between calls intended for data, and those for speech. * An intelligent speed buffered RS232 port and a wide range of available data rates makes this one of the most powerful multi speed range of modems available. * Line noise filtering ensures error free transmission and reception of data on long or noisy lines. * Internal battery backup allows storage of 63 names and telephone nos. * This range of modems can be factory fitted with high security data access protection system. * Models V2123 and V22 can be factory upgraded to V22bis standard giving a single compact modem capable of data rates from 75bps to 2400bps.

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them

WS3000 V21/23: This modem complies with the CCITT V21, V23 and Bell 103 standards and operates at CCITT standards for 300bps, 75/1200bps, 1200/75bps full duplex, 600bps and 1200bps half duplex, and the Bell standard for 300bps full duplex. £295 (b)



WS3000 V22: This modem operates on all V2123 standards plus V22 standard for 1200bps full duplex V22bis standard. £495 (b)

WS3000 V22bis: This modem operates on all V21/23 and V22 standards plus 2400bps full duplex. £650 (b)

BBC Data Cable for WS3000
£6 (d) Data cables for other micros available.

WS4000/'SCHOOLS' MODEM, a new low-cost high performance 'Hayes' intelligent modem with A/Dial and A/Answer and V21/23 at £149 (b)
A **V22** upgrade can be added at £250, and **V22bis** at £405. Other options, all priced at £50 are battery backup, Bell standards, Call Monitor, Control port and Tone Dialling. Please send for full details.

NEW

MIRACLES WS2000 This highly successful world standard modem, having BT approval, covering V21, V23, (BELL 103/113/108 outside the UK) and including 75,300,600, 1200 Baud ratings. What possible gives this modem its biggest advantage is its option of computer control. A 25Way RS232 input as well as possible computer controlled auto/dial/auto-answer makes this modem unique.
WS2000 £102 (c) Data Cable £7

WS2000 Auto-Dial card: includes an integral loudspeaker for monitoring of the phone line £30 (d).
BBC User Port cable (for modem control) £4 (d)

WS2000 Auto-Answer Card £30(d).
(Please note that the A/D & A/A Cards are still awaiting BABT Approval.)

SKI KIT (Allowing total control of the modem by your computer) £10 (d)

DS1 Disc (for Commstar): When used with the Auto-dial card, SK1 Kit, and a user port cable, this software will dial out to Prestel, enter your password etc. and leave you in Commstar. Will also store many bulletin board telephone numbers and protocols for autodialling £10 (d)

GEC DATACHAT 1223 Modem: An economically priced BABT approved modem complying with CCITT V23 standard capable of operating at 1200/75bps and 75/1200bps and 1200/1200bps pseudo full duplex. It is line powered does not require external power source. It is supplied with software suitable for connecting to PRESTEL, Micronet 800, Telecom Gold and a host of bulletin boards. £75 (b)

SPECIAL OFFER

As reviewed in June issue of Acorn User
'Worthwhile and above all easy to use package'

COMMUNICATIONS SOFTWARE

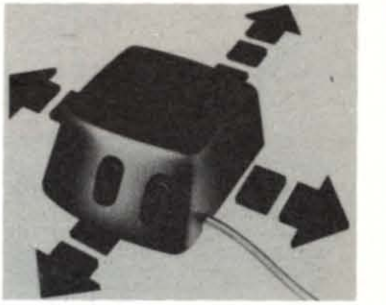
DATA-BEEB An advanced communication ROM from Miracle Technology. Its many features include both Viewdata (Prestel) and Terminal modes, Auto-Answer and Auto-dial for fully expanded WS 2000's etc. Macro facilities allow flexible use of its many facilities e.g. automatic dialling, log-on, going to a specific page, printing it, and going off-line, all in one operation. £24 (d)

TERMULATOR An advanced terminal emulator on a 16K Rom. Emulations include VT52/100, Tektronix 4010 etc. Allows a BBC to be used as a terminal for almost any mainframe computer or computer network. £25 (d)

COMMUNICATOR This is a full 80 col VT100 terminal emulation program on 16K eprom. It is a more advanced program than TERMI and features easy to follow screen menus. The rate at which data is sent or received is easily set up with rates up to 19200 Baud with 80 column text. Allows files to be transmitted from disc, or a copy of incoming data to be sent to a file or to a printer. (Communicator is not suitable for PRESTEL). £49 (d)
RS232 Solution (Book) £15.95 (c)

COMMSTAR An ideal communications rom for both Prestel and bulletin boards. Facilities include Xmodem, clock etc. £28 (d)
RS232 Solution Book £17.95 (c)

AMX MOUSE with SUPERART



The mouse will now be available with enhanced software, the 'SUPER ART' which is compatible with 6502 2nd processor, the ARIES RAM board, BBC+ shadow mode, tape and ACORN DFS and ADFS. Allows full use of colour in mode 1. Disc users can create colour pictures in A4 size with dot pattern editing, use of icons, additional text styles, superb zoom in colour.
There is a variety of optional software to make the mouse one of the most versatile peripherals that can be added to the BBC micro.

AMX Mouse with Super Art £67 (d)
AMX Super Art Package on its own £43 (d)
AMX PAGEMAKER provides a high resolution A4 Typesetting and Artwork system. £43 (d)
AMX 3D ZICON will let you transform three dimensional vector data and translate them into 3D on screen graphics. £21 (d)
AMX DATABASE is a new filing system with 1000 records per file and unlimited number of fields per record. £21 (d)

Fleet Street Editor £38 (d)

RB2 TRACKER BALL

A precision built tracker ball. Software allows RB2 to function instead of cursor keys, for word processing, CAD/CAM etc. Software includes a graphics/CAD package.
RB-21 (with 'icon artmaster'). £59 (c)

BBC COMPUTER SPARE PARTS

Complete Keyboard	£52	UPD7002	£5.00
Power Supply Unit	£52	DS3691	£3.50
Keyswitch	£1.75	7438	£0.40
Keyboard Connector	£4.00	74LSOO	£0.24
Video ULA	£18.00	74LSO4	£0.24
Serial ULA	£14.00	74LS10	£0.24
UHF Modulator	£4.50	74LS123	£0.80
6502A 2MHz CPU	£6.50	74LS163	£0.75
65C02 CMOS CPU	£12.00	74LS244	£0.80
6512AP CPU	£12	74LS245	£1.10
6522 VIA	£3.50	74LS373	£0.90
6522A 2MHz VIA	£5.50	74LS393	£1.00
LM3 24 op-amp	£0.45	8271	£46
SAA 5050-Teletext	£9.00	88LS120	£3.00
6845SP CRT Controller	£6.50	4464 RAM	£8.00
		O/S Basic B +	£25

All the above carry Carriage Code (d)

MERLIN

MERLIN is the ultimate utility ROM for the BBC and BBC PLUS (Master coming soon) — an optimum combination of the most useful, of Disc, Memory, and ROM management utilities. A total of no less than 57 essential commands ensure that this will be the last utility ROM you will purchase. It is suported by a 106 page comprehensive manual with detailed syntax, argument and error messages for each command, and all the utilities are fully 'Tube' compatible.

A selection of just some of the commands include:

APPEND — append Basic files
ARCHIVE — a unique disc/tape archive system
CDIS — a 6502/65C02 disassembler, also able to disassemble sideways
ROM/RAM and optional printer output.
CLONE — protected disc copier.
DBYTE — Disc byte search utility.
DSTRING — disc string search utility allowing localised string search.
DUAL/SWAP — allows second catalogue on disc for 60 files/side of disc.
EDSEC — an interactive disc editor, able to directly access sectors, read and write to sectors marked deleted, and editing of protected discs.
FORM — a formatter able to format all or part of disc.
GPACK/GEXPAND — an all-mode screen file compacter/expander enabling saving of upto 70% of screen memory.
MBYTE/MSTRING — memory byte/string search utility.
MEDIT — interactive memory editor.
REPAIR — atempts to recover data from a track and repair.
ROFF — disable a ROM.
SEDIT — interactive 'protected-disc' editor.
ZDUP — disc backup/format utility for ACORN & TORCH Z80 users.

As there are so many new commands, we have prepared a detailed leaflet describing all the commands — this is available on request.

MERLIN £37.50 (b)

FIRMWARE AND SOFTWARE

LANGUAGES

META-ASSEMBLER: For full details please see page 6 of this advertisement.

6502 DEVELOPMENT PACKAGE A Macro-Assembler with utilities for use with the 6502 2nd Processor. Enables the serious programmer to develop large programs in assembly language. £39 (d)

ACORN MICRO-PROLOG: The logic programming language seen as the language for programming in the future and used extensively in the artificial intelligence field. A simple 'front end' is supplied to make syntax more user friendly for new users. 16K Rom, manual and extension modules. £62 (c)

ISO-PASCAL Acorn's full implementation of International Standard Pascal on two 16K ROMs. Disc Version for use on 6502 2nd Processor also supplied. Comprehensive manual. £47 (c)

ISO PASCAL Stand ALONE GENERATOR: Utility to convert programs produced using ISO PASCAL for stand alone applications. £28 (d)

ACORN LOGO A full implementation of the Logo language from Acornsoft. Supplied as two ROMs with a tutorial course and technical manual. £42 (b)

LOGOTRON logo £56 (c)

BCPL A full implementation of the BCPL compiler language consisting of the language of ROM, disc containing the BCPL compiler, a screen editor, a 6502 assembler, other utilities and programming aids and examples of BCPL code and a 450 page manual. £42 (b)

BCPL CALCULATIONS PACKAGE Supplied on disc, it supports floating point, fixed point and fast integer calculations. It includes the BCPL calcultion files, example files and a comprehensive user guide. £15 (d)

BCPL STAND ALONE GENERATOR £36 (d)

Acorn LISP Rom, Acorn FORTH Rom, Acorn COMAL, (each) £39 (d)

MICROTEXT A frame based authoring system from National Physical Laboratory for interactive computer tutoring. Disc based. **Disc** £49 (c)

OXFORD PASCAL A fast, compact P-Code compiler, that fully utilises BBC Graphics and sound, contains a powerful editor, and produces 'standalone' software. (Specify 40/80T) £35 (c)

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£37 (d)	**MASTERFILE II**	£17.00 (d)
STARdataBASE	£49 (d)	**GEMINI'S DATAGEM**	£59 (c)

WORD-PROCESSORS

VIEW	£37 (d)	**HI VIEW**	£36 (c)
VIEW VERSION V3.0	£56 (c)	**VIEW INDEX**	£9 (d)
VIEW PRINTER DRIVER GENERATOR			£8 (d)
VIEWSPELL	£52 (d)	**WORDEASE**	£24.50 (d)
WORDWISE	£25 (d)	**SPELLCHECK III**	£31 (d)
WORDWISE PLUS	£42 (d)	**INTERWORD**	£49 (d)
EDWORD II			£42 (a)

SPREADSHEETS

VIEWSHEET Acorn's spreadsheet provides 255 columns and 255 rows and will operate in any mode. Windows can be created which can then be rearranged to provide any print format required. Function keys provide for easy entry of commands. Printer control codes can be used using the printer driver. Fully compatible with VIEW and the 6502 2nd Processor. £37 (d)

VIEWPLOT: A disc based Linear graph/barchart/piechart plotting program. £25 (d)

INTERSHEET The new spreadsheet from Computer Concepts. Many advanced facilities including 105 character display, several spreadsheets may be used at once, may be used with View & Wordwise etc. etc. £45 (c)

INTERCHART Graphics Package for the Intersheet. £30 (d)

ULTRACALC £39 (d) **QUICKCALC** £14.50 (d)

UTILITIES

ACCELERATOR	£49 (d)	**ACORN BASIC EDITOR**	£24 (d)
BROM	£28 (d)	**SLEUTH**	£24 (d)
TOOLKIT plus	£31 (d)	**EXMON-II**	£22 (d)
HELP II	£27 (d)	**DISC DOCTOR**	£26 (d)
DISCMASTER			£18 (d)
ACORN GRAPHICS ROM GXR.	£21 (d) (specify BBC B or PLUS)		
COMPUTER CONCEPTS GRAPHICS ROM			£20 (d)
PRINTMASTER	£25 (d)	**DUMPMASTER II**	£26 (d)
FONTWISE	£10 (d)	**FONTWISE PLUS**	£16 (d)
HERSHEY CHARACTER FONT GENERATOR			£18 (d)
ICON MASTER	£29 (d)	**STUDIO EIGHT**	£19 (d)
BILLBOARD	£18 (d)	**CC SPEECH ROM**	£28 (c)
ACORN'S CREATIVE SOUND	£15 (c)	**CC TEXT TO SPEECH**	£34.70 (d)
ACORN'S SPEECH PROCESSOR ROM	£15 (d)	**ROMIT**	£29 (d)
PROGRAM BUILDER	£18 (d)	**REPLICA III**	£12 (d)
DATABEEB	£24 (d)	**COMMUNICATOR**	£49 (d)
COMMSTAR	£26 (d)	**TERMULATOR**	£25 (d)
		MINI OFFICE II	£14.75 (d)

When ordering software on disc please specify track format (40/80)

BOOKS

No VAT on books; Carriage (c)

LANGUAGES:	
6502 Assy Lang Prog	£19.95
6502 Programming	£16.95
8086 Book	£23.95
Acorn BCPL User Guide	£15.00
Acorn FORTH	£7.50
Acorn LISP	£7.50
S-PASCAL	£7.50
Acorn ISO Pascal Ref Manual	£12.50
Intro to COMAL	£10.00
Intro to LOGO	£7.50
Micro Prolog Ref Manual	£12.50
Creative Sound	£7.50
Introduction to Pascal	£16.50
Prog the Micro with Pascal	£8.50
The UNIX Book	£7.50
Unix User Guide	£19.95
Understanding Unix	£18.45
BBC MICRO BOOKS FOR BEGINNERS:	
BBC User Guide Acorn	£15.00
BBC PLUS User Guide	£15.00
Drawing your Own BBC Programs	£6.95
Introducing the BBC Micro	£4.50
Mathematical Programs in BBC Basic	
PROGRAMMING/UTILITY	
Advanced User Guide	£12.50
Adv BASIC Rom User Guide	£7.50
Advanced Prog Tech for BBC	£8.95
Applied Ass./Lang on the BBC	£9.95
BBC Micro Advanced Programming	£9.95
BBC Micro Sideways ROM's RAM's	£9.95
BBC Micro Sideways Roms B. Smith	£9.95
Guide to the BBC ROM	£9.95
Exploiting BBC BASIC	£6.95
Further Programming for BBC	£4.00
Programming the BBC	£6.50
Structured Programming	£6.50
Using BBC BASIC	£10.00
View 3.0 User Guide	£12.50
Viewstore	£12.50
Viewsheet	£12.50
Word Processing on BBC (Wordwise + Epson)	£5.25
SOUND & GRAPHICS:	
Advanced Graphics with BBC	£6.00
BBC Graphics & Sound	£7.50
Creative Sound on the BBC	£9.95
Graphics on the BBC Micro	£6.00
DISC DRIVE SYSTEMS:	
Advanced Disc User Guide	£14.95
BBC Micro Disc Companion	£7.95
Disc Book	£3.50
Disc Programming Techniques	£7.95
Disc Systems	£6.95
APPLICATIONS:	
BBC Filing Systems & Databases	£7.95
Business Programming on BBC	£7.95
Business Applications on BBC	£7.95
DIY Robotics & Sensors	£6.95

TECHNOMATIC

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
Telex: 922800
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Access Card

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

EDUCATIONAL SOFTWARE

We are pleased to announce that we now stock the full range of BBC Publications Educational software for the BBC computers. This software which is in many cases developed alongside radio and TV programs from the BBC Education Department, has all been tested in many schools, and by education experts to ensure the high quality one would normally expect from BBC. These packages supplement the class room learning by providing moving and colourful graphical displays which normally cannot be easily produced on the blackboard and help in ensuring clear understanding of a variety of subjects. The software has received wide acclaim from teachers, and in the educational press. All cassette programs transfer easily to disc, and all disc programs can be run on 40 or 80 track drives.

PRIMARY LEARNING

ASTRONOMY
Aimed at the 9-12 age group, programs include Phases of the Moon, Eclipses, Seasons of the Year, Planetary Motions and Lander which is a gravitationally accurate game. All programs feature colour graphics 💾 £12 (d)

COMPUTERS AT WORK: THE WORK GAME
Uses the technique of computer synchronised audio to illuminate two of the most important applications of computers — robotics and information technology. Includes a complete database program, tutorial on word processing principles, and robot control program driven by a logo-type language.
💾 EC £13 (d)
⌒ 💾 EC £17 (c)

DRAWSTICK
For children aged 8 upwards allowing them to create pictures, charts, maps and diagrams. It is sufficiently sophisticated for use by older children and adults. Pictures are saved in a compressed form, and can be incorporated in your own programs. Uses keyboard or joystick.
💾 £9 (d)

INTRODUCING GEOGRAPHY
Four exciting graphic adventure simulations to bring geography to life for the 9-13 age group. River involves navigating a river's course to the sea. In Flight, you fly an aircraft round the world. Summit takes you up Mount Everest, and Nomad involves survival in the desert.
💾 £17.20 (d)

MATHS WITH A STORY 1
Four primary-level maths programs suitable for children of a wide range of abilities. Topics include symmetry, co-ordinates, and probability.
£9.50 (d)

MATHS WITH A STORY 2
These further four maths programs are for the same age/ability range as pack 1, and cover similar topics, from different angles. £9.50 (d)

NUMBER GAMES
Six maths programs designed to please the eye and stimulate the mind of any active and adventurous child aged 8 upwards.
EC £8.65 (d)

USING YOUR COMPUTER
A friendly and original introduction to computers using the computer synchronised audio technique. Written for a 8-12 year old but also suitable for any complete novice. Total of 80 minutes of audio material and 14 programs.
£26.00 (c)

WORD PLAY
An elegant but simple program to introduce primary school age children to the concept of word processing. Search, delete, justify etc have small animal icons associated with them. Fun manual for small children. £10.75 (d)

DRAWSTICK £8.50 (d)

SECONDARY LEARNING

ADVANCED LEVEL STUDIES: STATISTICS
Six programs covering the central concepts and principles of statistics. Topics covered are Discrete Data and Binomial Distribution, Continuous Data and the Normal Distribution, Hypothesis testing and confidence intervals, Central Limit theorem and Estimation, Simulations, Correlation and regression.
💾 £25 (d)

ADVANCED STUDIES: GEOGRAPHY
Four programs examining aspects of social geography — traffic and town planning, drainage basin management and planning for industry. Users can alter the models. Details in the comprehensive manual.
💾 £11 (d)

INSIDE INFORMATION
Designed to provide a basic introduciton to information technology for young people and adults. The course assumes no prior knowledge of the subject and is suitable for use in secondary schools, further education colleges, ITeCs and adult education centre. This software can be used alone, or in conjunction with the BBC's Inside Information radio series.
💾 EC £11 (d)

OPEN LOGO
Developed by the Open University to provide a full implementation of Logo — the language of learning — for the BBC Micro. 2 × 16K ROMS and two detailed manuals (120pp and 300pp)
💾 EC £61 (c)

SCIENCE TOPICS: WAVES
A secondary level physics program allowing the student to learn about waves by displaying waveforms on screen. Parameters can be altered and the results observed immediately.
💾 £15 (d)

SCIENCE TOPICS: RELATIONSHIPS
A secondary level biology program giving a sophisticated simulation exercise for students, based on data from the World Health Organisation. You are malaria control officer for an African village, and you must use the right combination of drugs, pesticide and education to combat the disease.
💾 £15 (d)

SCIENCE TOPICS: BONDING
A secondary level chemistry program designed to reinforce and strengthen students' concept of the bonding of elements. Transfer and sharing of electrons are both shown graphically.
💾 £15 (d)

SCIENCE TOPICS: ELECTROMAGNETIC SPECTRUM
A secondary level graphical adventure designed to test your knowledge of the electromagnetic spectrum. You are lost in space, and you must build a radio, perform spectroscopic analysis etc. to complete the adventure. 💾 £15 (d)

SCIENCE TOPICS: ELECTRONICS IN ACTION
A secondary level program about using computers for control. The pack gives three simulations of control systems. Control is achieved using a subset of 6502 assembly language. A program editor is supplied.
💾 £15 (d)

SCIENCE TOPICS: NEWTON AND THE SHUTTLE
This secondary level interactive program in three parts follows the space shuttle from launch to recapture of a satellite in space. Students knowledge of Newtonian mechanics is tested at each stage.
💾 £20 (d)

SCIENCE TOPICS: ECOLOGY
This program allows students to take the part of groups who manage a nature reserve according to their own special interests. The object is to keep all groups satisfied.
EC £20 (d)

SCIENCE TOPICS: POLYMERS
Students run a manufacturing company and must make decisions as to the best materials to use for their products. They compete with a computer run rival company. Two areas of manufacturing are featured — car parts and kitchen equipment. EC £20 (d)

SECONDARY SCIENCE: MICROTECHNOLOGY
This software for the 14-16 age group will help students understand certain fundamental concepts in basic electronics. The pack contains Logic and Resistor Tutors, a Servo circuit simulation and a Circuit Design program.
£7

SECONDARY SCIENCE: THE MOLE CONCEPT
A computer synchronised audio program which explains definitions of atomic and molecular masses and attractively depicts molar equations. The audio track is written and presented by Fred Harris.
⌒ 💾 EC £17 (c) 💾 EC £13 (d)

SECONDARY SCIENCE: UNIFORMLY ACCELERATED MOTION
A physics program which illustrates basic equations, uniform acceleration under gravity and the idea of terminal velocity. The medium is computer synchronised audio.
⌒ 💾 EC £ 17 (c) 💾 EC £13 (d)

VU-TYPE
The popular 'sight and sound' touch-typing tutor using colour graphics. The layout and parameters can be altered. 23 exercises can be loaded from disc.
💾 EC £16 (d)

GENERAL

GAME CORE
This software gives you all the information and intelligence routines you need to write simple and highly absorbing board games for your computer.
£9 (d)

MONITOR
A professional tool for mahcine-code programmers, suitable for assembly language experts and beginners alike. It is also ideal for teaching assembly language.
EC £34 (d)

TOOLBOX 2
25 programming aids for the BBC Model B. Book (essential) sold separately. Program include machine code monitor, disassembler, fast flood fill, sprite generator/mover, and many more. £9 (d)

ULTRACALC 2
An electronic spreadsheet program with all the necessary built-in features. Ideal for business and personal management. £52 (d)

VU-TYPE PROFESSIONAL
An enhanced and expanded version of Vu-Type including many 63 Pitman-approved exercises. 💾 £19 (d)

WORD MOVER
A' simple text editor offering the basic facilities of a fully fledged word processor, especially suitable for network environments where ROMs are impractical. Includes a terminal emulator. EC £9 (d)

WHITE KNIGHT Mk 12 £16 (d); **BATTLEFIELDS** £8.50 (d)
DEUTSCH DIREKT £17 (d); **A VOUS LA FRANCE** £17 (d)

💾 **Disc** **EC Network Compatible** ⌒ **Audio Cassette**

TECHNOMATIC

01-208 1177

BBC Computer & Econet Referral Centre

MAIL ORDER
17 Burnley Road
London NW10 1ED

RETAIL SHOPS
15 Burnley Road
London NW10 1ED
Tel: 01-208 1177
Telex: 922800
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road
London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Access Card

Orders welcome from government depts & educational establishments.

All prices ex VAT
Prices are subject to change without notice

Please add carriage
(a) £8 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

Source file assembler

KEVIN EDWARDS reviews the Meta Assembler development system

Product: Meta Assembler
Price: £145 plus VAT
Supplier: Crash Barrier, Freepost, Flitwick, Bedford MK45 1YP. Tel: 0525 717148

META Assembler, from Crash Barrier, is a development system for the BBC Micro which allows you to create and assemble source files for a wide range of processors including the 6502, 6800, 6809, Z80 and 68000/8. The object code produced can then be sent to the target machine via the RS423 port using the built-in serial communications software.

The package consists of two sideways ROMs, an A4 file containing the documentation, two system discs and a function key strip for the editor.

The first disc contains example source files for a maze game and shows many of the useful features provided by the assembler. The other disc has the translation files for the different processors.

These contain exact details of the instructions for each processor so that Meta can check the syntax of the source and produce the correct object code.

Once the ROMs have been fitted the command *META is used to enter the system, after which the currently selected drive is started up and the file *ROOT* – if present – is loaded from the current directory. The main menu is now displayed with 10 options (see Figure I).

If no root is found, as is the case when Meta is first used, option 7 should be selected from the menu. This creates the root file for the processor being used. It achieves this by reading in the relevant translation file from the system disc.

Next, the amount of RAM to be reserved for the labels must be chosen. This is in 2k steps between 2k and 10k – sideways RAM may also be used. The smaller the label space the greater the maximum size of the modules/macros that can be present in memory.

When a program is being assembled the first file loaded is always *ROOT*. Without this, Meta doesn't know what type of source code it's assembling. Using the instructions within the root the various modules are now loaded and assembled.

Pressing Escape while at the main menu enters the Meta editor. This produces a clear and detailed Mode 7 screen showing the amount of text memory left, the name of the file being edited and the target processor type.

Movement through the text is achieved using the cursor arrows as well as Shift, Ctrl and Tab. The function keys are used to drop, kill and find markers, move and delete text, and so on. Pressing f8 evaluates the numeric expression at the cursor position. This useful facility permits symbols to be examined after assembly.

Creating the source is a simple task as the editor is easy to use and provides all of the facilities you'd expect to find in a source file editor.

Although the screen can only display 40 characters across, remarks can be placed on an adjacent screen. This is automatically displayed whenever the cursor is moved off the left or right edges.

If, during assembly, the mnemonic/directive field of the source file is not recognised Meta will search the current directory for the corresponding filename. This is loaded and the assembly continues from where it left off.

These external files may be either modules or macros. In the case of macros relevant parameters are passed in the operand field.

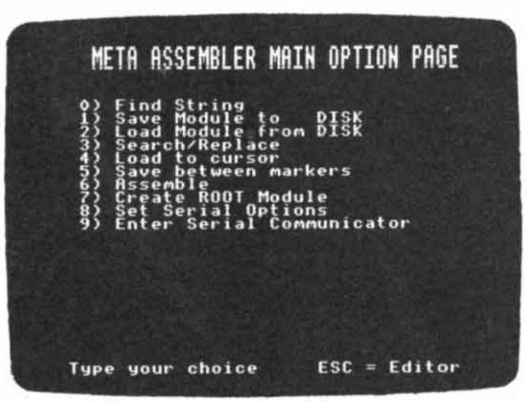
Meta supports many directives, including the high level instructions IF, ELSE, ENDIF, REPEAT and UNTIL. Figure II lists the directives and their associated parameters.

The directives OBSEND and OBFORM control the destination and format of the object code respectively – see Figures III and IV.

The OBSEND 6 option sends data to the eprom emulator, PORTAL – also available from Crash Barrier. This makes the object code appear in the target processor's memory map just as if it had been placed in eprom – very clever. At last programs can be tested immediately after assembly without the hassle of programming eproms.

Meta supports all the standard bitwise, logical and arithmetic operators and works to 32 bits so that the 68000 can be catered for. Expressions can be nested by square brackets up to eight levels. The $ symbol can also be used to refer to the current value of the program counter.

The radix designators for constants may be altered, permitting you to prefix hex numbers with $ or & or suffix them with H. For example, the following are all equivalent hex numbers – $BF, &BF



```
META ASSEMBLER MAIN OPTION PAGE

0) Find String
1) Save Module to    DISK
2) Load Module from DISK
3) Search/Replace
4) Load to cursor
5) Save between markers
6) Assemble
7) Create ROOT Module
8) Set Serial Options
9) Enter Serial Communicator

Type your choice      ESC = Editor
```

Figure I: Main option page

→

```
DISPLAY  <string>                            DC.L    <long-word>,<long-word>..   GLOBAL
EJECT                                        DS.B    <no. of bytes>              ALIAS   <string>
PAGE                                         DS.W    <no. of words>              LOAD    <filename>
FORM                                         DS.L    <no. of long-words>         SKIP    <no. of bytes>,<fill byte>
HEADER   "<string>"                          EQUB    <byte>,<byte>..             SLIST   <ram bank>,<ram bank>..
LIST     ON/OFF                              EQUW    <word>,<word>..             OBFORM  <format>
PASS1    ON/OFF                              EQUL    <long-word>,<long-word>..   OBSEND  <destination>
ENABLE   <option>                            EQUS    "<string>"                  ORG     <new address>
PRIN     <ctrl code>,<ctrl code>..           FCB     <byte>,<byte>..             OFFSET  <offset>
PRINT    <expression>                        FDB     <word>,<word>..             END     [<execution ads.>]
TITLE    "<string>"                          FCC     "<string>"                  IF      <expression>
FIELDS   <lab.>,<opc.>,<oper.>,<lab.>        MODULE  ON/OFF,[<ctrl code>]..      ELSE
DATA     <byte>,<byte>..                     MACRO   <param>;param>..            ENDIF
DC.B     <byte>,<byte>..                     MEND                                REPEAT
DC.W     <word>,<word>..                     LOCAL                               UNTIL   <expression>
```

Figure II: Meta directives

From Page 45

and 0BFH.

All symbols defined within macros are automatically made LOCAL, unless the GLOBAL directive is used at the start of the source file. The opposite happens with modules.

Alias labels permit string symbols to be defined. Each time the alias label, preceded with a colon, is located its value is substituted in the source before being assembled.

If Meta encounters a problem during assembly one of around 35 different messages will be produced. In addition to this the editing cursor is placed over the statement in question, ready for modification.

As well as the editor and assembler Meta also supports serial communications.

The serial options menu – obtained by selecting option 8 from the main menu – allows you to define the settings for serial communications. This includes the baud rates for receive and transmit, data format, whether control characters are filtered, and so on.

When any of these are altered the translation file in memory is also updated so that the options are retained whenever *ROOT* is loaded – assuming the root file has been loaded and saved during the process.

Option 9 is the actual serial communicator from which you can talk to the target computer. As with the editor, you can use f8 to evaluate an expression, the result of which is automatically sent to the other system.

Meta has plenty more features which are beyond the scope of this review. Every facility I required was there and worked in just the way I wanted it to.

This flexible, straightforward and comprehensive cross assembler is a pleasure to use. Let's hope more products of the same quality appear in the future.

OBSEND format	Destination
0	Nowhere
1,<load>,<exe>,<fsp>	File
2	User port
3	Printer port
4,<baud>	RS423
5,<bank>	Sideways RAM
6,<EPROM>,<PORTAL>,<opt>	PORTAL

Figure III: OBSEND options

OBFORM format	Format type
0	No output
1	Straight binary
2	ASCII space
3	Intel hex
4	Motorola
5	Internal

Figure IV: OBFORM options

PROBLEM

I WOULD be grateful if you would throw some light on the following problem encountered with my BBC Micro fitted with an Acorn DFS supplied by Viglen.

Certain discs such as the Viglen utilities and Paul Daniel's Magic Show will not auto boot, catalogue or load on my machine – I obtain disc fault OC at 00/00. The same discs function perfectly on any BBC Micro at my place of work.

What puzzles me is that all discs that I have personally formatted and saved programs on function correctly every time. – R. Brown, Skelmersdale.

SOLVED

There is nothing wrong with your computer, it is your disc drive that is out of alignment.

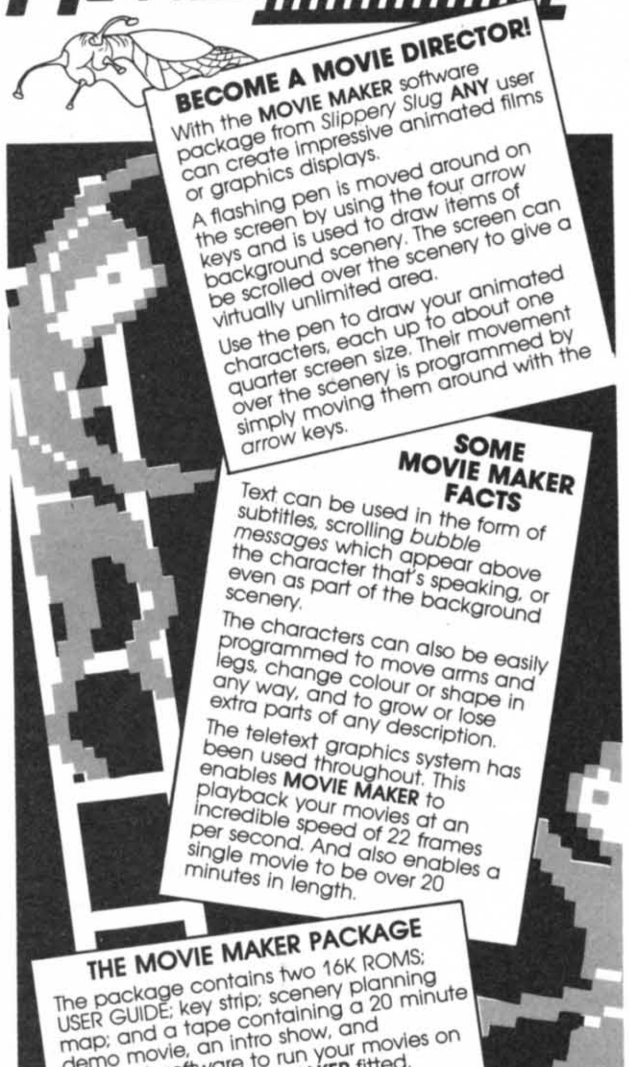
There is a switch inside the drive that detects when the head is at track zero. On your drive this is out slightly so the head is not being positioned correctly.

This is fine on your own discs as the tracks were formatted with this misalignment "built in". However on discs formatted on other drives the head is not being correctly positioned over the track and so it can not read it.

Try swopping the disc drive with the one you have at work to confirm this. If you have your drive re-aligned there is a danger that it will not read your own discs any more, but you should be able to reach a compromise position where you can read both.

Adjustment of this switch should only be attempted by a competent engineer who has the correct test gear.

MOVIE MAKER



BECOME A MOVIE DIRECTOR!

With the **MOVIE MAKER** software package from *Slippery Slug* **ANY** user can create impressive animated films or graphics displays.

A flashing pen is moved around on the screen by using the four arrow keys and is used to draw items of background scenery. The screen can be scrolled over the scenery to give a virtually unlimited area.

Use the pen to draw your animated characters, each up to about one quarter screen size. Their movement over the scenery is programmed by simply moving them around with the arrow keys.

SOME MOVIE MAKER FACTS

Text can be used in the form of subtitles, scrolling *bubble messages* which appear above the character that's speaking, or even as part of the background scenery.

The characters can also be easily programmed to move arms and legs, change colour or shape in any way, and to grow or lose extra parts of any description.

The teletext graphics system has been used throughout. This enables **MOVIE MAKER** to playback your movies at an incredible speed of 22 frames per second. And also enables a single movie to be over 20 minutes in length.

THE MOVIE MAKER PACKAGE

The package contains two 16K ROMS; USER GUIDE; key strip; scenery planning map; and a tape containing a 20 minute demo movie, an intro show, and playback software to run your movies on micros without **MOVIE MAKER** fitted.

Requires a BBC model B, B+, or MASTER micro, tape or disc based. Can be run in sideways RAM.

Mail order price **£29.90** fully inclusive. Or for a detailed description of **MOVIE MAKER'S** extensive facilities send £1.95 for the introductory pack (price refundable against purchase) which contains an intro tape and brochure.

To: Slippery Slug, PO Box 83, Bath, BA1 1ZA.
Telephone Bath (0225) 69236

Please rush me the following:
Qty **MOVIE MAKER** pack(s) at £29.90 each.
Qty Introductory pack(s) at £1.95 each.
Cheque/PO enclosed for £
NAME __________
ADDRESS __________
__________ **Postcode** __________

It will draw praise from designers ...

... pass the laboratory test ...

... and be an education in itself ...

PT

Back-up without danger of piracy

By IAN WHITMORE

Product: Replay
Price: £35
Supplier: Vine Micros, Marshborough, Nr. Sandwich, Kent CT13 0PG. Tel: 0304 812276

MANY facilities are advertised to enable BBC Micro users to copy or back-up protected programs and transfer them from tape to disc.

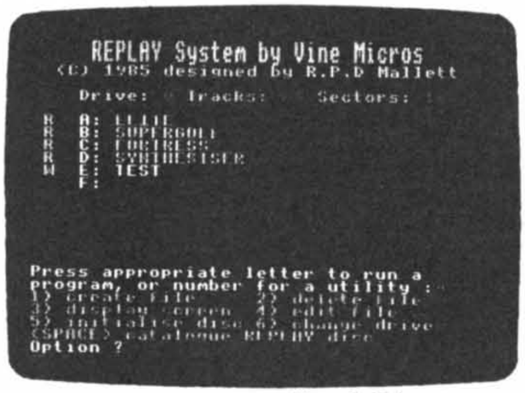
While some break the protection in the process and thus assist software piracy, others are more responsible, using techniques which retain the protection. Vine Micros, who already leads the field in the latter group with the TD ROM, now supplies Replay.

It consists of a 16k eprom mounted on a 28 pin socket connected by a set of leads to a small printed circuit board which in turn is connected to a 16 pin IC header, two small connectors and to a push button switch.

Installation instructions are easy to follow and although fitting is slightly more complex than a simple ROM, it should present no difficulty to the average BBC Micro user. Once fitted my micro behaved as normal, with no clashes revealed during the time I have had the review copy.

Vine Micros matches Replay to the floppy disc controller chip, so I assume it acts as its own disc filing system. Vine also claims that different Replays will not load files from each other or other systems, so continuing the backup with protection afforded by TD ROM.

Typing *REPLAY reveals the main system menu – see Figure I – from which each freshly formatted disc for use with Replay must be specially initialised. After this they cannot be used with other data.



```
REPLAY System by Vine Micros
(C) 1985 designed by R.P.D Mallett
   Drive:    Tracks:     Sectors:
R  A: ELITE
R  B: SUPERGOLF
R  C: FORTRESS
R  D: SYNTHESISER
W  E: TEST
   F:

Press appropriate letter to run a
program, or number for a utility :
1) create file     2) delete file
3) display screen  4) edit file
5) initialise disc 6) change drive
(SPACE) catalogue REPLAY disc
Option ?
```

Figure I: Main system menu

Transferring files from any other system requires a file to be created on the Replay disc using option one. After pressing Break, you load or run your game or utility in the usual way, from tape or disc, pressing the Replay button when you have reached a stage that you want to save.

This freezes the micro, leaving only the keys needed in Replay still active and the Caps Lock and Shift Lock lights flashing alternately. Pressing function keys 0, 1, 2 or 3 will save the whole of the BBC Micro's 32k of memory on to the relevant side of a Replay formatted disc, then allow the program to continue.

In order to re-run your program from the Replay disc you must re-enter the main menu and press the relevant letter key. The program is loaded and continues from the point it was saved.

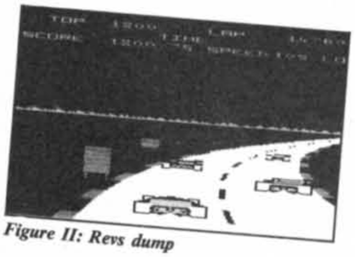


Figure II: Revs dump

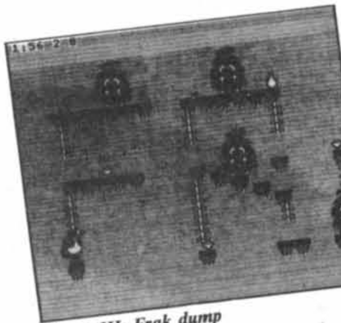


Figure III: Frak dump

It is also possible just to load the screen, which can then be dumped to a printer with a suitable dump routine. Using this facility I have been able to produce dumps of program screens – Figures II and III – previously impossible without a lot of hard work, if at all.

In the development of Replay Richard Mallet found one area of problems in the special screen formats used by some games and utilities.

The 6845 video controller chip possesses a number of registers which control the display. Several of these are write only and are thus unreadable by Replay which reloads the screen but is garbled. The ROM has the ability to write to these registers when reloading a program, obtaining the data from one of two sources.

For several named games, such as Elite, the data is held on the chip and is programmed in when the game is originally saved on a Replay disc if it has been given the correct name.

The second way is to use the edit facility – see Figure IV – from the main menu. You are presented with a screen allowing the setting of most of the 6845

→

PLOTMATE

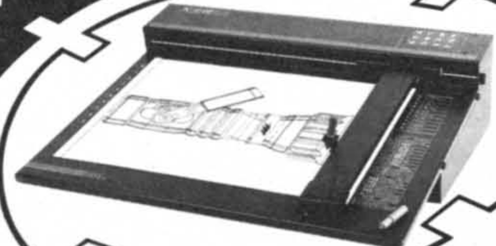
EXTENDS YOUR SYSTEM OPTIONS

Plotmate graphics plotters are compatible with all leading micros. They run on a wide range of Linear Graphics' and third party software and have numerous functions and add-on capabilities ideally suited to the requirements of the Education, Industry and Business environments.

All of which means that for between £299-£549 you can greatly extend your present system's options for a fraction of what you thought it would cost.

ACORN
IBM
ATARI
AMSTRAD
RML
and other micros

SCANNER
CERAMIC PEN ADAPTER
DRIVER ROM — GXR COMMANDS
ROTRING ADAPTER



PCB DESIGN
CAD
DATA DISPLAY
MATHEMATICAL MODELLING
MAPPING
Plus Third Party Software

EMULATES SWEET P & WATANABE
SCALING
WINDOWING
CHOICE OF INTERFACE MODES
KEYPAD FACILITATES PEN CONTROL

- **PLOTMATE A4 — £299**
- **PLOTMATE A4M — £399**
- **PLOTMATE A3M — £549**

For further information please contact

PLOTMATE

LINEAR GRAPHICS LTD
28 Purdeys Way Purdeys Industrial Estate Rochford Essex SS4 1NE
Tel 0702 541664 Telex 995701 Ref 356

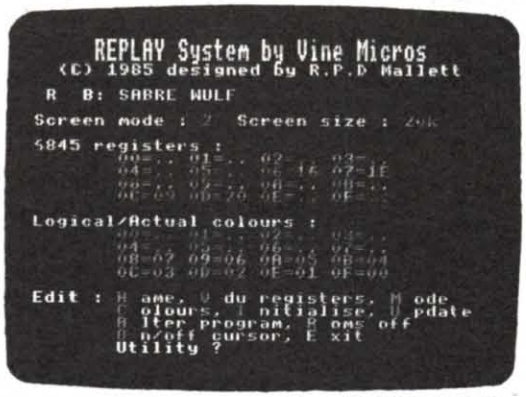
PROBLEM

I USE a BBC B with a TV and sometimes the screen jumps and flickers. It appears to happen randomly. – Warren Day, Enfield.

SOLVED

This is probably due to a faulty socket or connection in the UHF modulator. You can get replacement modulators from Watford Electronics.

It is simple to replace but you will need a large capacity soldering iron, say about 40W.



```
REPLAY System by Vine Micros
(C) 1985 designed by R.P.D Mallett
 R  B: SABRE WULF
Screen mode : 2  Screen size : 20k
6845 registers :
          00=.. 01=.. 02=.. 03=..
          04=.. 05=.. 06=16 07=1E
          08=.. 09=.. 0A=.. 0B=..
          0C=09 0D=20 0E=.. 0F=..
Logical/Actual colours :
          00=.. 01=.. 02=.. 03=..
          04=.. 05=.. 06=.. 07=..
          08=07 09=06 0A=05 0B=04
          0C=03 0D=02 0E=01 0F=00
Edit :  N ame, 6 du registers, M ode
        C olours, I nitialise, U pdate
        A lter program, R oms off
        O n/off cursor, E xit
        Utility ?
```

Figure IV: 6845 edit facility

From Page 48

registers, the logical/actual colours and the screen mode.

It is also possible to alter the program – Vine Micros provides tips for infinite lives and so on on some games. Other facilities switch off ROMs and cursor, and allow files to be continuously updated so you can save a game over and over again as you progress with it.

Replay transferred every file I tried from tape to disc, and has replayed almost everything set for it. Although not a 100 per cent successful in reloading screens I found it very useful, providing easy access to screens for dumping for reviews.

Here is the opportunity for BBC Micro users who have many games on tape to transfer them to disc with ease and at a reasonable cost.

QUAL-SOFT **THOUGHTWARE** **Sports simulations**

"A real challenge to the thinking football fan . . . Bobby Robson could do worse than have a crack at this in his preparation for the World Cup".

AMSTRAD ACTION REVIEW Jan '86

QUAL-SOFT COMMENT: ***At last an INTELLIGENT management game for the knowledgeable soccer enthusiast!***

In 1966 Alf Ramsey proved that English club soccer players, with intelligent management, could not only dominate European club football, but could take on, and beat the rest of the world at International level. Could you do the same in . . . .

Tape 1 (Qualifiers)
+ **Tape 2** (Finals)
+ 20 Page Booklet
£9.95

MEXICO '86*

A WORLD CUP MANAGEMENT SIMULATION

DISC
Qualifiers + Finals
+ 20 Page Booklet
£12.95

Summer 1984 and English International football is at its lowest ebb. We have failed to qualify for the European Nations Cup, and had a string of very poor International results. In a few months we will set out on the '86 World Cup qualifying trail. You have been given the most important job of restoring English pride in their football. You have a match in Paris, the USSR at Wembley, and a South American tour, to assemble a team, first to qualify, and then to beat the world's best in Mexico.

TAPE 1 (Qualifiers)

★ Current squad of 16 players + 20 user defined players.
★ Friendlies in Paris, at Wembley + South American tour.
★ ANY team formation you choose. 2 from 5 substitutes.
★ In match tactics: any no. of individual player adjustments.
★ Your qualification group: full results and table.

TAPE 2 (Finals)

★ Choose a 20 man squad to take to the finals.
★ Group of 4 prelims. 16 to final knockout comp.
★ Extra Time, PENALTY SHOOT-OUTS, where relevant.
★ Formation and strength information on opposition.
★ 2 from 9 substitutes (the FA tells us so).

ENGLAND'S GAMES: FULL PITCH, 22 MAN, 3D GRAPHICS & SOUND EFFECTS

QUAL-SOFT comments: With 5 levels of play, 12 depths of sophistication, and "fun" graphics, this game can be enjoyed by an 8 year old youngster as a "fun" game, and by the most sophisticated as a tactical/strategy challenge of the highest order.

QUALSOFT GUARANTEE: We will send your package by 1st class letter post on the day we receive your order with PO, cheque or ACCESS card authorisation. Programs are IN STOCK because we manufacture them!

*** The use of the name MEXICO '86 does not imply any association with FIFA**

QUAL-SOFT, **Tel: 0438 721936**
Dept. MU
18 Hazelmere Rd.,
Stevenage, Herts SG2 8RX.

Please supply:
MEXICO '86
Electron ☐
BBC 'B' ☐ T ☐ 40 ☐ 80

Name: ....
Address: ....
....
Access No. (if applicable) ....

INCREMENTING MEMORY VIA ABSOLUTE ADDRESSING

MIKE BIBBY helps make sense of machine code – Part 6

WE have already met two additional registers for the 6502, the X and Y registers. We saw that we could increment and decrement these with INX, INY and DEX, DEY, although we couldn't do so with the accumulator.

We could however increment memory via absolute addressing. We can also increment memory via zero page. Program I shows how.

```
Locations  Mnemonics   Opcodes
  2000     LDA #&00    A9 00
  2002     STA &70     85 70
  2004     INC &70     E6 70
  2005     RTS         60
```

Program I

Here the first two instructions make the contents of &70 zero. Notice the zero page STA and the fact that &70 is one of the memory locations the BBC Micro reserves for us in zero page, &70 to &8F.

We then INC the value of &70 – again a zero page instruction, taking its contents to one. To check that its contents really have changed use Hexer's display memory option or try:

```
PRINT ~?70
```

Now have a look at Program II. It's virtually the same as Program I except that it starts by storing &FF into &70, then increases the contents of &FF by one.

Program II is by way of an experiment. We know that the largest number we can store in a memory location is &FF. So what happens when we increase it by one?

If you run it you'll probably be surprised to find that &70 now contains zero. It's easily explained though. The contents of a byte act a bit like those of a car's odometer – the display that gives a car's mileage. When you get past the maximum (999,999 on the odometer, 255 on the byte) the contents of both become zero.

```
Locations  Mnemonics   Opcodes
  2000     LDA #&FF    A9 FF
  2002     STA &70     85 70
  2004     INC &70     E6 70
  2006     RTS         60
```

Program II

Another way of looking at it is that when you go past a byte's maximum size you've gone round the clock and are back at zero.

So if you increase a byte past its maximum size it goes back to zero, but what happens if you decrease it past its minimum size zero?

```
Locations  Mnemonics   Opcodes
  2000     LDA #&00    A9 00
  2002     STA &70     85 70
  2004     DEC &70     C6 70
  2006     RTS
```

Program III

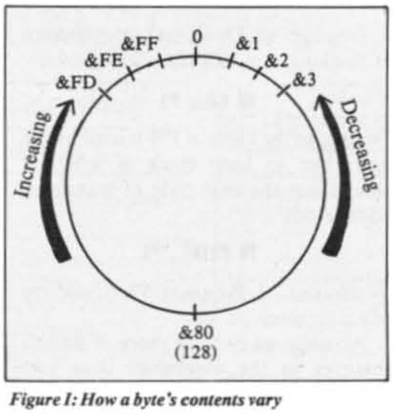


Figure I: How a byte's contents vary

Program III shows the answer – when you decrease zero by one you're left with &FF. In other words we've gone round the clock backwards. Figure I shows how this works in practice.

And now for something completely different. Take a look at Program IV, our beeping program. It should present no problems, we just translate the appropriate hex code from the mnemonics then poke it into memory byte by byte via Hexer and run it.

I have however mentioned that the BBC Micro has a built-in assembler which will translate or assemble our mnemonics into opcodes for us. Not only that, it even stores it in the appropriate memory locations.

All we have to do is to enter our mnemonics with line numbers in front of them, as in an ordinary Basic program. However the BBC Micro needs to know three additional things:

```
LDA #7
JSR &FFEE
RTS
```

Program IV

- Where to put the code.
- Where the mnemonics to be translated start.
- Where the mnemonics finish.

Program V shows how we would accomplish the assembly of Program IV in practice. Again I stress that Program V is a Basic program with line numbers. The assembler is an intrinsic feature of BBC Basic. Other Basics are not so generous.

Line 10 tells the assembler where to

→

From Page 51

put the code. This is determined by the value of *P%*. In this case we're storing it at &900, a safe location in an area of memory reserved for cassette output operations which we won't be using.

```
10 P%=&900
20 [
30 LDA #7
40 JSR &FFEE
50 RTS
60 ]
```

Program V

Line 20 tells BBC Basic that the next lines are mnemonics to be translated into hex and stored from *P%* onwards. It uses the left square bracket ([) to indicate this. In Mode 7 this appears as a left-pointing arrow.

Lines 30 to 50 then contain the mnemonics to be assembled or translated into hex. You should be able to follow this by now – the only new things are the line numbers.

Line 60 tells Basic that we've finished all the mnemonics we wish to assemble by using the righthand square bracket]. This appears as a right-pointing arrow in Mode 7.

To assemble the code – that is, to translate from mnemonics into hexadecimal – we simply RUN the Basic program. Figure II shows the output on your screen, giving feedback on the assembly in much the same form as we're used to – locations where it's stored, the mnemonics and the opcode.

Note that although we've run the Basic program so that it puts the code into memory we still haven't run the actual code itself. To run it we need to:

```
CALL &900
```

CALL is the Basic keyword that hands control of things over to the machine code program at the address specified. It's up to you to supply the code at the address and make sure that it ends with an RTS to return to Basic.

Don't confuse the two operations – you RUN the Basic program to put the code into memory, then you run the assembled code with a CALL to its start address. If you wanted you could run the code immediately after it has been assembled by adding:

```
0900
0900      A9 07        LDA#7
0902      20 EE FF     JSR&FFEE
0905      60           RTS
```

Figure II: Output of Program V

```
70 CALL &900
```

to Program V.

Take a look at Program VI. Believe it or not the machine code generated is identical to Program V. I've used the assembler's ability to deal with variables or labels to good effect though. By defining *beep=7* in line 10 we can use:

```
LDA # beep
```

instead of:

```
LDA #7
```

which I think you'll agree is far more readable.

Similarly the assignment of line 20 means I can use:

```
JSR oswrch
```

rather than:

```
JSR &FFEE
```

It's good practice to use labels in this fashion instead of numbers. It makes programs far clearer, particularly when the listings get longer.

```
10 beep=7
20 oswrch=&FFEE
30 P%=&900
40 [
50 LDA #beep
60 JSR oswrch
70 RTS
80 ]
```

Program VI

To run the assembled code automatically you can add:

```
90 CALL &900
```

to Program VI. Don't make the mistake of thinking you can use:

```
90 CALL P%
```

though, as the value of *P%* is used by the assembler to keep track of where it should put the next byte of translated code. Add:

```
90 PRINT ~P%
```

to the end of Program VI to see the effect of this.

Actually we can use more of Basic's features in the assembler than just variables. As Program VII shows we can use functions too. In line 60 we want to load the accumulator immediately with the Ascii code for the letter A. Instead of:

```
60 LDA #65
```

or:

```
60 LDA #&41
```

we can use:

```
60 LDA #ABC("A")
```

The rest of the program is very similar to one we had last month. As we press a key the letter displayed changes from A to B to C. This time though the letter is displayed at the top right of the screen, hence the label *topright*. See if you can work out exactly how it works for yourself.

```
 10 MODE 7
 20 topright=&7C27
 30 osrdch=&FFE0
 40 P%=&900
 50 [
 60 LDA # ABC("A")
 70 STA topright
 80 JSR osrdch
 90 INC topright
100 JSR osrdch
110 INC topright
120 RTS
130 ]
140 CALL &900
```

Program VII

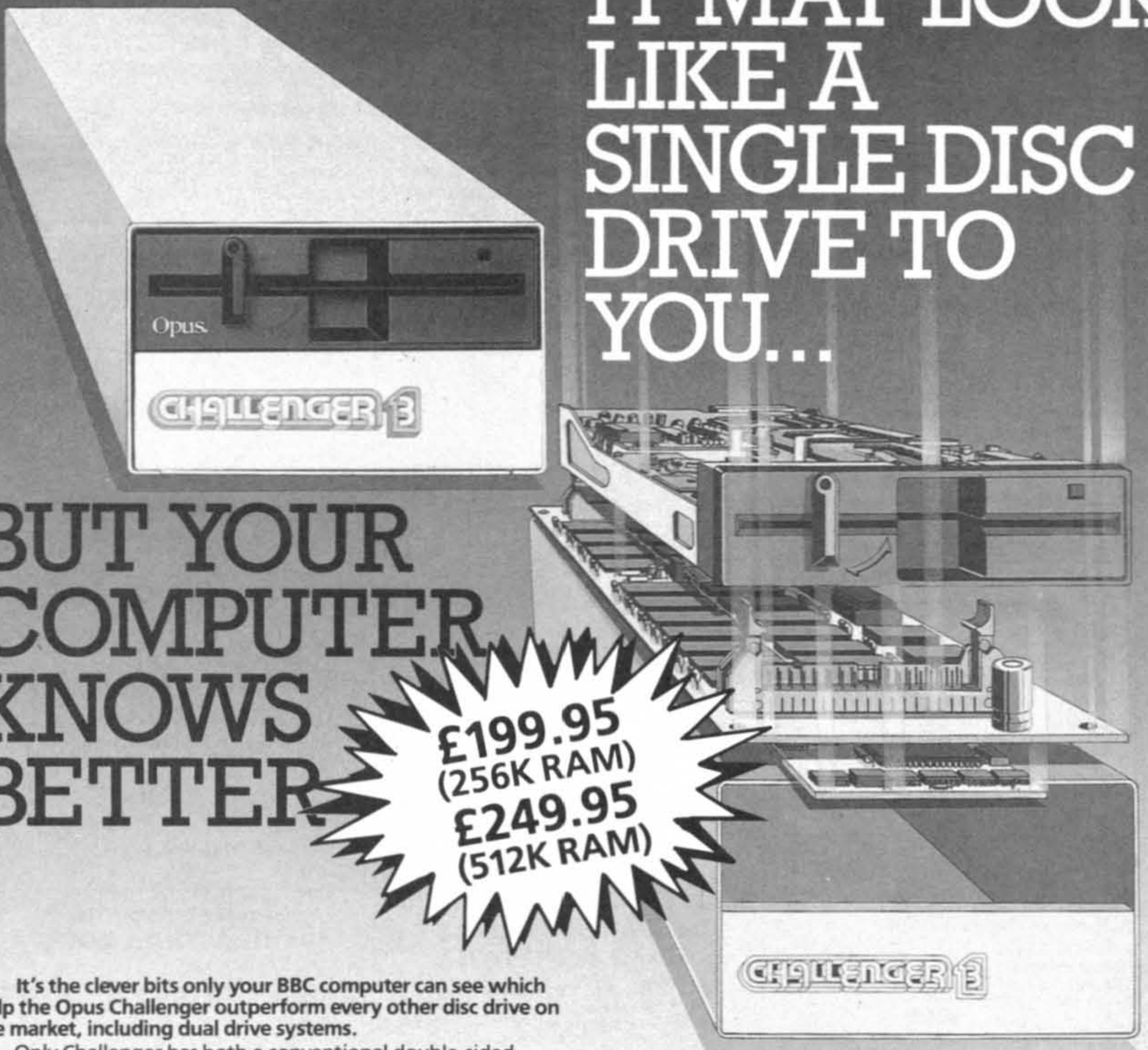
For homework this month try creating versions of Programs I, II and III using the built-in assembler. Actually you should be able to run any of the programs we've met so far this way. I suggest you run them all with *P%* at &900 for the time being. Remember your programs must:

- Set *P%* to locate the code in memory.
- Have [before the mnemonics to be assembled.
- Have] after the mnemonics.

If you use Programs V and VI as models you won't go far wrong. Remember to check the code generated by the assembly against the code I've given before you CALL it, just in case of any slips.

- *There's a lot more to using the assembler than you've met so far, but you've had more than enough to be going on with. Get plenty of practice in, as we've got some interesting ideas next month.*

IT MAY LOOK LIKE A SINGLE DISC DRIVE TO YOU...



BUT YOUR COMPUTER KNOWS BETTER

£199.95
(256K RAM)
£249.95
(512K RAM)

It's the clever bits only your BBC computer can see which help the Opus Challenger outperform every other disc drive on the market, including dual drive systems.

Only Challenger has both a conventional double-sided floppy disc drive and a high technology RAM disc, effectively a second, lightning fast solid state disc drive which turns your unit into a unique dual system with up to a massive 1.2 Megabytes of useable capacity.

Only Challenger has its own built-in double density disc interface, making all that soldering and track cutting associated with other interface connections, a thing of the past. Just plug-in and away you go.

You'll find more performance than from any dual disc drive system and from only £199.95, Challenger is up to £50 cheaper than even the most inexpensive twin drive and interface package. Unbeatable value and a unique 3-in-1 combination:

- **5¼" DOUBLE-SIDED 40/80 TRACK DISC DRIVE**
- **BUILT-IN DOUBLE DENSITY DISC INTERFACE**
- **INTEGRAL SOLID STATE RAM DISC** Up to 20 times faster than a disc drive and now available in 256K and 512K versions

With all that power and performance you can race through work conventional disc drives labour over and, when you need to save to floppy, the RAM disc backs-up your information in a fraction of the time without any need for tiresome disc swopping. A & B Computing, which voted Challenger "Best buy of the year", said: "Using the RAM disc is a real dream... We checked a document just over 21K long, which took 5 minutes 56 seconds on floppy and only 1 minute 7 seconds using the RAM disc".

You don't even need to worry about compatibility. We've fitted the same disc controller chip used on the BBC B + to make Challenger compatible with all leading software titles and it's suitable for use with the new 128 Master Series.

Challenger's price even includes VAT, FREE 72-hour delivery, the unbeatable Opus two-year warranty and a full operating manual.

So call us now on 0737 65080 for details of our nationwide dealer network or simply post the coupon. Generous education and dealer discounts available.

CHALLENGER – SIMPLY LIGHT YEARS AHEAD OF THE OPPOSITION

To: Opus Supplies Limited, 55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.
Please rush me the following: (PRICES INCLUDE VAT AND CARRIAGE)
________ Challenger Unit(s) £199.95 each including 256K RAM disc
________ Challenger Unit(s) £249.95 each including 512K RAM disc
I enclose a cheque for £ ________ or please debit my credit card account with the amount of £ ________
My Access ☐ Visa ☐ no. is: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
NAME ________
ADDRESS ________
____
TELEPHONE ________ BBC

Opus.

Watford Electronics

Jessa House, 250 Lower High Street, Watford, England
Tel: Watford (0923) 37774/40588 Telex: 8956095 WATFRD
Credit Card Orders (ACCESS & VISA) Tel: (0923) 33383 or 50234 (24 Hours)
All prices exclusive of VAT; subject to change without notice & available on request.

By popular demand our retail shop is now open till 8.00pm every Thursday.

BBC B + Micro 64K + DFS	**£365**
BBC B + 64K + Econet No DFS	**£359**
BBC B + 64K + DFS + Econet	**£399**
64K Upgrade Kit for B+	**£32**
BBC MASTER 128K Micro	**£425**
BBC MASTER TURBO 4MHz	**£510**
TURBO Add-on Module	**£89**
Master E.T.	**£335**
Econet Module for the Master	**£43**
Reference Manual I	(No VAT) **£15**
Reference Manual II	(No VAT) **£15**
Advance Ref. Manual	(No VAT) **£19**
1770 DFS Upgrade Kit	**£42**
ECONET Upgrade Kit for BBC	**£42**
ECONET UPGRADES Available	

SPECIAL OFFER

FREE
with every BBC Master purchased from us this month.
GEMINI's NEW DATAGEM II (ADFS version)
worth £79.95 separately
including VIEW/WORDWISE PLUS mail-merge utility.

6502 Acorn 2nd Processor package	**£165**
Z80 Acorn 2nd Processor package	**£319**
Acorn IEEE Interface Complete	**£280**
Acorn Teletext Adaptor	**£125**
Acorn Prestel Receiver	**£115**
Acorn Bitstick I	**£299**
Robocom Bitstick II	**£759**
Upgrade for B1 to B2	**£450**
Bitstick Multiplotter Driver	**£65**

(Securicor carriage £7)

EPSON LX-80 PRINTER

Low cost, High performance printer. Print speed 100 cps, NLQ mode 22 cps. Full FX80 compatible. Friction feed supplied as standard. Tractor Feed & Auto Single Sheet Feeder, optional extras.

Price: **£189** (carr £6)
Tractor Feed Attachment **£20**
Single Sheet Feeder **£49**

VARIOUS PRINTERS

● EPSON GX80	**£187**
● EPSON RX100	**£342**
● EPSON FX80 Printer	**£259**
● EPSON FX85 Printer	**£315**
● EPSON FX105 Printer	**£435**
● EPSON LQ1500 Printer	**£869**
● EPSON JX-80 Colour Printer	**£435**
● EPSON Hi-80 Printer Plotter	**£319**
● EPSON Paper Roll Holder	**£17**
● FX80 tractor attachment	**£35**
● SEIKOSHA GP50A & GP50S	**£69**
● Centronics Printer Cable to interface all the above Printers to BBC	**£6**

(Securicor carriage charge on printers £7)

RX & FX PRINTER INTERFACES

Epson interfaces fit inside the printer to allow connection using techniques other than Centronics.

RS232	**£27**	RS232 + 2K Buffer	**£55**
IEEE 488	**£65**	RS232 + 8K Buffer	**£75**

Official ACORN Distributor

CENTRONICS GLP & Brother M1009 (NLQ) Printers

A major price break-through in NLQ Printers from Watford

At last, a full feature Epson compatible NLQ printer at a price that everyone can afford. Due to Watford's bulk purchasing power and low margins we can now offer this incredible printer deal direct from the manufacturers to our customers.

The Centronics GLP printer which is manufactured by BROTHER (and also marketed by them under their own brand name M1009), features a Near Letter Quality (NLQ) mode using a 23 by 18 dot matrix for each NLQ character (this is the same as is used by the very popular Kaga Taxan printers). The NLQ Font Rom supplied is Watford's own Professional NLQ ROM for the GLP.

Single, double and quadruple density graphics modes as well as four character widths and super/sub script printing are also supported, along with many other facilities normally found on printers costing twice as much.

Although the GLP is a very compact printer, it can handle paper up to 10 inches wide. Friction feed is supplied as standard with a low cost tractor feed available as an optional extra.

GLP is bidirectional logic seeking. Has a 9 needle print head.

Special Offer ***£99*** *(carr £5)*
Tractor Feed Attachment **£9**

Centronics GLP Mk2 (Brother M1109) NLQ Printer

At 100 CPS this new Centronics NLQ printer is twice as fast as the standard GLP printer. It too is bi-directional logic seeking. Friction feed supplied as standard, tractor feed extra optional.

Launch Price: **£159** (carr. £5)
Tractor Feed Attachment **£9**

By popular demand our retail shop is now open till 8.00pm every Thursday.

BROTHER HR-15XL

The new improved Brother HR15XL is a very high quality and very fast daisy-wheel printer for serious use. Notable features of this printer include a 10k buffer, 20cps, bi-directional proportional spacing, Centronics interface standard, (RS232 optional), optional Sheet Feeder and Keyboard.

ONLY **£285** (carr. £7)

Single Sheet Feeder	**£185**
Electronic KEYBOARD	**£135**
TRACTOR FEED Attachment	**£84**

Ribbon Cartridges:
Fabric **£3;** Carbon **£3;** Multistrike **£5**
DAISYWHEELS (various typefaces) **£18**

PRINTER SHARERS
(Ideal for School environment)

Connect 3 BBC Micros to 1 Printer	**£60**
Connect 6 BBC Micros to 1 Printer (Cables extra)	**£129**
Connects 3 Printers to 1 Micro	**£65**

KAGA KP810 NLQ PRINTER

This rugged printer is made by Canon of Japan and is the same as Canon PW1080. It is fully Epson FX80 compatible and offers superb NLQ printing.

Our Price: ONLY ***£210*** (£7 carr.)

Kaga RS232 Interface	**£49**
Kaga RS232 Interface + 2K Buffer	**£69**
Kaga RS232 Interface + 16K Buffer	**£95**

KAGA KP910 Printer

Similar to the KP810 but has 17" wide carriage for wide print. Gives 156 columns of normal print or 256 columns in condensed mode. Ideal for printing out spreadsheets.

ONLY **£339** (£7 carr.)

PRINTER LEAD

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA etc. printers.

Standard length (4 feet long)	**£6**
Extra long (6 feet long)	**£8**
RS232 Cable	**P.O.A.**
IBM Parallel 1 meter Cable	**£12**

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
FX100	£7.00	£5.25
FX80/MX80	£4.50	£4.95
RX80	£4.50	£4.50
LX80	£4.00	£4.50
GP80/GP100	£4.50	£4.00
GP250	£5.95	£3.95
Centronics GLP	£4.00	£3.75
KAGA KP810	£5.25	£4.75
CANON PW1080	£5.25	£4.75
Microvitec Metal Monitors	–	£5.50

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

1,000 Sheets 9½" × 11" Fanfold Paper	**£7**
2,000 Sheets 9½" × 11" Fanfold Paper	**£12**
1,000 Sheets 15" × 11" Fanfold Paper	**£9**
Teleprinter Roll (Econo paper)	**£4**

Carriage on 1,000 Sheets £1.50

PRINTER LABELS
(On continuous fanfold backing sheet)

1,000 90×36mm (Single Row)	**£5.00**
1,000 90×36mm (Twin Row)	**£4.90**
1,000 90×49mm (Twin Row)	**£7.50**
1,000 102×36mm (Twin Row)	**£6.25**

Carriage on 1,000 Labels £1.00

NEW

SEIKOSHA MP1300AI Professional Printer

This new professional quality NLQ printer's draft mode speed of 300 cps and 50 in NLQ makes it an ideal business printer at a budget price. It can even be upgraded to COLOUR by the simple addition of a "Clip-on/Clip-off" colour Kit (optional).

A give away at
only: **£425** (carr. £7)

HITACHI 672 PLOTTER

Only: £450 (Carr £6)

We stock a range of monitors to suit all needs. Choice of a monitor is a matter of personal taste so we recommend that whenever possible, you ask for a demonstration at our shop. All Monitors are supplied complete with connecting lead.

MICROVITEC 14"

1431 – Medium resolution as used on the BBC television computer programme	**£176**
1451 – High resolution, suitable for word processing in mode 0	**£225**
1441 – High res, exceeds the capabilities of the BBC micro	**£365**
1431AP RGB + PAL and AUDIO	**£199**
1451AP RGB + PAL and AUDIO	**£259**
2030CS 20" RGB/PAL/Audio	**£375**
2040CS 20" RGB/PAL/Audio	**£655**
TOUCHTEC Touch Screen Pack	**£250**
Dust Cover for Microvitecs	**£5.50**

KAGA/TAXAN 12"

KAGA KX1201G Hi-res Green Monitor	**£90**
KAGA KX1202G Long persistance Hi-Res Green Monitor	**£105**
KAGA KX1203A Ultra-Hi-Res Amber Monitor	**£105**
KAGA Vision 2, Hi-Res, RGB Colour Monitor	**£210**
KAGA Super Vision 3, Ultra Hi-res, RGB Colour; Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue	**£330**
PHILIPS 12" Hi-Res Amber Monitor	**£73**

FIDELITY COLOUR MONITOR

- Medium Resolution, attractively finished, 14" RGB and Composite VIDEO/AUDIO Input. Has a detachable anti-glare screen.

£169

ZENITH

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. (These are the same professional quality, stylishly finished monitors as used in the larger Zenith Micro Systems.)

Green (New Design) Hi-res	**£72**
Amber (New Design) Hi-res	**£82**

LEADS

BNC Lead for Zenith or Philips	**£3**
RGB lead for KAGA	**£3**

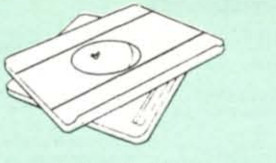
N.B. Carriage on Monitors **£7** (securicor)

CREDIT CARD Orders (ACCESS or VISA)

Simply phone
(0923) 33383/50234
24 Hour Ansaphone Service

SWIVEL BASES

for Video Monitors



Adjust your Monitor/VDU, Up, Down, Right or Left to provide utmost in operator flexibility & Viewing comfort. It improves your sight lines & reduces stress & eye, neck and back strain. Available in 2 sizes:

for 12" Monitors **£14** (carr. £2.50)
for 14" Monitors **£16** (carr. £2.50)

SPECIAL OFFER

EPROMs for BBC's Sideways ROMs.

2764-250nS £1.85
27128-250nS £2.45

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £3.15
2 × 6264LP (16K) £6.00

BBC MICRO WORD-PROCESSING PACKAGE

A complete word-processing package (which can be heavily modified to your requirements, maintaining the large discount). We supply everything you need to get a BBC micro running as a word-processor. Please call in at our retail shop to discuss your particular requirement and a demonstration.

EXAMPLE PACKAGE
BBC Master 128K Micro, View wordprocessor, Viewsheet, Basic Editor, Terminal Emulator, Twin 800K 40/80 track double sided Disc Drives, Zenith Hi-Res green monitor, Brother HR15LX professional quality Daisy Wheel printer, Gemini Database, Spreadsheet, Beebplot Graphics, Cashbook, Final Accounts, Mailist, Easiledger, Invoice & Statements, and Stock Control packages on disc with manuals.

Only £999

THE EPSON RX/FX/KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX/KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, Canon PW1080A or any Epson FX80 compatible Printer with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

Superb Value at **£5.95** (No VAT)

Watford Electronics' Overseas Dealers:

Absolute Electronics, 483 Centre Road,
Bentleigh, Victoria, Australia 3204.
Tel: (03) 557 3971

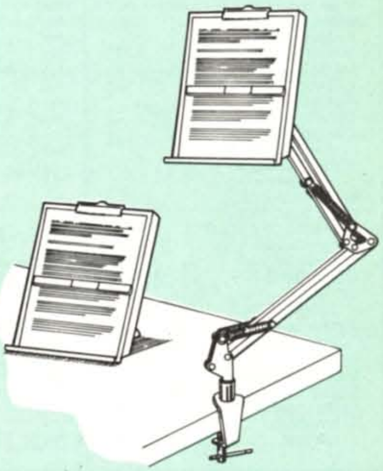
First Ludonics International, 2400
AJ Alphen aan den Ri jn, Nedherlands.
Tel: 01720 72580.

Scientex PVBA, Willem Ogierplaats 2
B-2000 Antwerpen Belgium.
Tel: (03) 233 59 06

Technomatic, Hesselager 13,
2605 Brondby, Denmark.

Viking Tecno, Vestergade 12.1, 9620
Aalestrup, Denmark.
Tel: (08) 642522

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.

Available in desk resting and shelf clamping versions, these two units hold your paper firmly by means of a magnetic ruler and a clip grip.

Mounting to a convenient flat surface, the two joint anglepoise Manuscript Holder allows the paper to be positioned at virtually any convenient angle whilst only taking up a fraction of the surface area that the paper being held does.

The smaller desk resting Manuscript Holder is useful for the more organised desk where the problem is simply holding the paper at the right angle.

Whatever desk arrangement you use, surely you deserve a Watford Manuscript Holder!

Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£17** *(carr. £3)*

All prices in this advert are exclusive of VAT.

MARK 2 LIGHT PEN

You no longer have to fiddle with the brilliance control or work in the shade as this NEW Mark II Light Pen is totally insensitive to local lighting conditions. It only operates on high frequency light from the TV or Monitor.

The red LED Indicator on the Mk II pen, lights up when valid video data is available. Your program can have access to this signal allowing computer verification of target for high res drawing. The conveniently located switch on the pen body allows the computer to ignore any stray signals. Supplied complete with the sophisticated PEN-PAL Software on Cassette or Disc. Please specify.

Mark II Light Pen **£25**

Continued →

The ULTIMATE DFSs for the BBC MICRO

WATFORD TOPS THE DFS CHART

Watford's Ultimate DFS has scored highest points in ACORN USER's unbiased DFS's Review of July 1985.
In concluding, the reviewer writes "It must be said that Watford's DFS certainly offers a comprehensive range of facilities at a very attractive price". (Please write in for comprehensive details.)

Just compare the features:

Features	Acorn 1.20	Watford Single Density	 Double Density
Max nos. of files per disc side	31	62	62
Max disc capacity	800k	800k	1440k
Tube compatible	Yes	Yes	Yes
Built-in Editor	No	Yes	Yes
Built-in Formatter	No	Yes	Yes
Built-in Verifier	No	Yes	Yes
MRUN a file	No	Yes	Yes
MLOAD a file	No	Yes	Yes
Extended RENAME	No	Yes	Yes
Selective COPY	No	Yes	Yes
Default file name	No	Yes	Yes
Disc space distribution	No	Yes	Yes
40/80 Software Switchable	No	Yes	Yes
Wide catalogue	No	Yes	Yes
Close open files	No	Yes	Yes
Improved OPENOUT	No	Yes	Yes
Copy between densities	N/A	N/A	Yes
OSWORD &7F	Yes	Yes	Yes
Full entry point compatibility	Yes	Yes	Yes
Retain information over a break	1.20 partial	1.43 Yes	1.53 Yes
Games compatibility	Yes	Yes	Most
Econet file server	Yes	Yes	Yes
Econet station	Yes	Yes	Yes
Full wildcard facilities	No	Yes	Yes

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for three years, and has gained a large following amongst serious users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. (P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS).

PRICES

- *Complete Disc Interface Kit incl. DFS ROM & fitting instructions* **£50**
- *Acorn's 0.90 DFS Kit complete* **£47**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**
  (P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs)
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics. Every ROM carries a special label with our LOGO and serial number.*

WATFORD's DOUBLE DENSITY DFS INTERFACE

The DDFS from Watford Electronics represents a new standard in DFSs for the BBC micro. This is a double density version of our popular single density DFS, and combines all the features of this powerful DFS with the advantages of a system that gives 80% more storage per disc in double density mode. P.S. – Please note that not all DDFSs are capable of providing either the full 80% storage increase, or of allowing a file the full size of the disc – Ours allows both of these! Operates both in Single & Double Density modes.

The typical piece of games software these days is provided upon a protected disc. In order to work on any double density system (including the others on the market) a protected piece of software needs to make calls through the OSWORD &7F routines. To ensure compatibility, the Watford DDFS features probably the most comprehensive and powerful 8271 emulation ever written for a double density system.

PRICES

- *Complete DDFS Kit incl. fitting instructions* **£46**
- *DDFS Manual* *(no VAT)* **£6.95**
- *We will exchange your existing Single Density DFS Kit for our DDFS Unit at* **£35**

Watford Electronics DDFS PLUS for the BBC B Plus

Watford Electronics was the first company to produce a serious alternative Disc Filing System (DFS) for the standard BBC micro. Since then, we have been refining and advancing this sophisticated product right up to today.

Now WE'VE DONE IT AGAIN; Watford proudly presents the Double Density Disc filing system for the BBC B+, with all the advantages of the advanced Watford DDFS available on the new BBC B+ DDFS.

Acting as a powerful alternative DFS to Acorn's '1770 DFS' supplied with the BBC+, this superb addition to any BBC+ greatly enhances it's performance with a simple fitting operation.

DDFS PLUS incorporates all the features of the Watford's popular DFS & DDFS for the BBC B, (at the same time retaining full compatibility with Acorn DFSs), plus it has the following extra features:

Automatic density selection – Full single and double density operations – Extremely powerful and comprehensive OSWORD &7F emulation – Any file can be full size of disc – Density of last access assumed for speed – Automatic 40/80 stepping swapped on error – All Acorn's extra disc commands implemented.

As you can see from the above information, Watford's DDFS for the BBC+ is far more sophisticated and well thought out than the standard. Take any disc produced by any Watford DFS from the standard BBC and catalogue straight off with no problems.

Unlike the Acorn 'ADFS', our DDFS+ system is just as easy to use as the standard DFSs, with no new complex concepts to have to learn. The features within our DFSs have been constantly enhanced over a period of three years during the time that they have been released; significant attention has been paid to feedback from our customers so that the features offered are carefully honed to the requirements of hobbyists and serious programmers alike.

The Watford DDFS+ is supplied with a comprehensive DDFS manual that explains the basics of disc drives, DFSs, etc. Priced at only £30 including the manual, the Watford DDFS+ is surely one of THE best buys you could make for your BBC B+!

Join the leaders in BBC peripherals; join Watford Electronics – committed to supporting the BBC micro.

DDFS PLUS (for BBC Plus) **£30**
(Price includes comprehensive
manual)

Special DISC UPGRADE OFFER

Acorn/BBC 100K Single Slimline 40 track Disc Drive and Watford's or Acorn's Single Density Standard Disc Interface Kit complete with Utility Disc and Manual.

Only **£99** (carr. £6)
(Offer valid while stocks last)

All prices Exclusive of VAT

By popular demand our retail shop is now open until 8.00pm. every Thursday.

MYSTERIES OF DISC DRIVES & DFS REVEALED

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

For instance, what is the difference between single and double density formats, how can you use a 40 track disc on an 80 track disc drive? What is the difference between a DFS and disc interface kit? Should you acquire a single Disc drive or twin? What does 48 TPI and 96 TPI discs mean? These are just a few of the questions you may have asked yourself and never found the answer or maybe you have yet to encounter these questions.

Now the mystery of buying a suitable interface and disc drive for your BBC micro is revealed in Watford's new book entitled 'MYSTERIES of DISC DRIVES & DFS REVEALED'. It describes in fine detail, yet remaining very readable to the beginner, how disc drives operate, the type of interfaces available, which type of discs to use on a disc drive and how data is stored on the discs.

£5.95 (Book No VAT)

DUST COVERS (For our Disc Drives)

Single CLS (without PSU)	**£3.20**	Twin CLD (without PSU)	**£3.85**
Single CS (with PSU)	**£3.95**	Twin CD (with PSU)	**£3.90**

ACORN WINCHESTER DRIVES

Complete with Level 3 File Server Software.

10 Megabyte **£1050.00**
30 Megabyte **£1549.00**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates the single density capacity. The double density storage capacity is second one, (that within the brackets). All disc Drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). Both are of Japanese manufacture.

With two prices in a box (e.g. £295/£299), the first price is for the standard drive and the second for the same unit in switchable type. Users of either of the two Watford DFSs will not need switchable drives as their DFS will provide software switching for them.

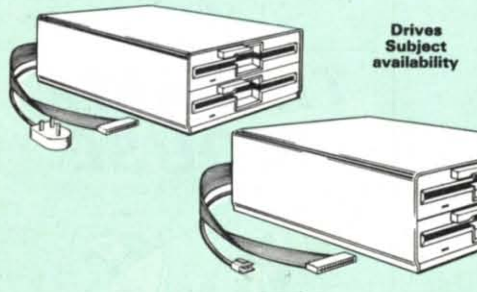
***All our Disc Drives (except CLS100) are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality Epson and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate: extensive tests within our workshops have confirmed this. All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. (Ideal for Schools & Colleges. All single disc drives with power supply, (i.e. CS100, CS200 & CS400S) are supplied in a twin case with twin data cable for later inclusion of a second drive). At Watford we anticipate your needs of tomorrow not just today!

When using a BBC Micro, most people find themselves preciously short of space. The Watford's BBC Micro Plinths form an ideal way of recovering some of this space; your BBC, disc drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. Some of our competitors offer disc drives built into plinths, but these aren't as sensible as you might think. With a Watford Plinth, your disc drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen and paper, reference manuals, etc. Follow the trend with Watford Plinth.



Drives Subject availability

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
100K (180K)	CLS 100 £75		CS 100 £116	
200K (360K)	CLS 200 £102	CLD200 £185	CS 200 £116	CD200 £199
400K (720K)	CLS 400 £104 £105 CLS400S	CLD 400 £185	CS400 £123 £124 CS 400S	CD400 £205
800K (1.44M)		CLD800 £194 £195 CLD 800S		CD800 £218 £219 CD 800S

- TWIN Disc Drive Case, complete with Power Supply & Cables **£35**

Securicor carriage on Disc Drives £6

Prefix **C** *= Cased Drive*
L *= Less PSU*
S *= Single*
D *= Double*

Suffix **S** *= 40/80 Switchable*

e.g. CLS400S = Cased drive, Less power supply unit, Single 400K, Switchable (40/80 track).

All our switchable drives now have a smartly mounted **front panel** 40/80 switch for ease of use.

3M – DISKETTES

Top quality 3M – SCOTCH Diskettes from Watford Electronics (Your 3M Appointed Distributors). All our discs carry a lifetime warranty. These discs are quiet in operation and insert positively with their reinforced hub rings. Boxes of 10 supplied complete with self stick disc labels and write protect tabs.

● *10 × 5¼" S/S D/D 40 Track Diskettes*	**£11**
● *10 × 5¼" D/S D/D 40 Track Diskettes*	**£13**
● *10 × 5¼" S/S D/D 80 Track Diskettes*	**£19**
● *10 × 5¼" D/S D/D 80 Track Diskettes*	**£20**
● *10 × 3½" S/S D/D 40/80 track Discs*	**£25**
● *10 × 3½" D/D D/D 40/80 track Discs*	**£35**

TOP QUALITY 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

● *10 ×* **M4** *S-S D/D 40 Track Discs*	**£10**
● *10 ×* **M5** *D/S D/D 40 Track Discs*	**£12**
● *10 ×* **M7** *D/S D/D 80 Track Discs*	**£17**

- **3"** *Double Sided Discs* **£4** *each*

This month's
STAR OFFER

Buy any two packs of the 3M or our own brand TOP QUALITY DISKETTES and we will give you absolutely FREE – yes absolutely FREE – our 5¼" Floppy Disc Head Cleaner Kit.

(Offer valid while stocks last)

Special BULK OFFER on 5¼" DISCS

(Supplied packed in plastic storage Units)
(Lifetime warranty on Discs)

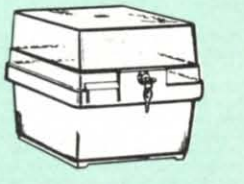
Type	Description	Pack of 20	Pack of 50
M4	Single/Side Double/Density 48TPI	£17	£42
M5	Double/Side Double/Density 48TPI	£21	£56
M7	Double/Side Double/Density 96TPI	£29	£70

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

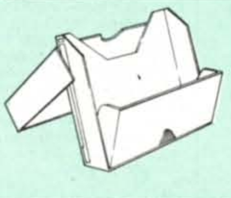
£4

LOCKABLE DISC STORAGE UNITS



Strong plastic case that afford real protection to your discs. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

M35 - holds upto 40 discs	**£9**
M85 – holds upto 95 discs	**£11**



PLASTIC LIBRARY CASES

FOR 5¼" DISC STORAGE
holds 10 Discs. **£2.00**

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use.

£8

EPSON NLQ ROM
for the BBC Micro

Harness the full potentials of your Epson RX & FX Printers. Impress your friends and business colleagues with the quality of your letters and printed material with Watford's very simple to use EPSON NLQ! (Near Letter Quality) ROM. Suitable for FX80, RX80, RX80F/T, FX100.

Look at the features:
- Simply type *NLQ80/100 and a single VDU code to use NLQ print.
- NLQ is then available without any modifications from BASIC, WORDWISE, VIEW (with NLQ DRIVER) or virtually any other program or language.
- Single codes select PROPORTIONAL type (yes even on the RX80); ENLARGED type; UNDERLINED type. These features can be used seperately or in any combination.
- Full UK character set; Standard 'pica size'; Proportional spacing; Enlarged; Underlined; Normal type.

The NLQ ROM is supplied complete with comprehensive manual.

P.S. NLQ ROM is compatible with the Torch Z80 system and can be used from within the Perfect Writer software.

Only: £25

VIEW PRINTER DRIVER for NLQ ROM

This specially written printer driver has been designed to allow View access to the full features of our NLQ ROM.
A must for all VIEW and NLQ ROM users.

£7.00
(Hi-View compatible)

THE NLQ DESIGNER

KAGA KP810/910 and Canon PW1080 are two superb printers, as our many thousands of satisfied customers would surely attest to. One of it's particularly strong points is the NLQ option that it offers; perhaps one of the more weaker points is the effort required to design your own custom NLQ font.

Well the solution is here NOW in the shape of Watford's NLQ DESIGNER ROM! For the BBC Micro. This powerful piece of software allows easy design and entry of a full NLQ font, with further fonts recallable from disc. Once a font has been programmed with the versatile NLQ DESIGNER, it can be saved to disc, downloaded to your Kaga (or Canon) printer, or even programmed into an EPROM (given the appropriate hardware) and then plugged directly into your printer so that it is available immediately when you turn it on. Downloadable Fonts require 6264 RAM chip fitted.

A 40 or 80 track (please specify) disc containing 3 example fonts is included in the package.

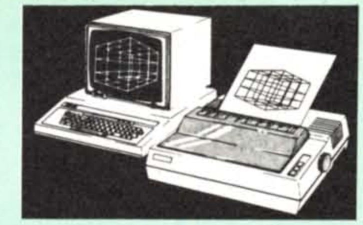
(P.S. This ROM is not suitable for Epson printers.)

- NLQ Designer ROM & FONT Disc **£25**
- Kaga Individual FONT ROMs **£15**

(Write in for further details).

ALL PRICES EXCLUSIVE OF VAT

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including all Mode 7 facilities etc. We have to admit that there is one facility that we cannot replicate – if anyone can supply flashing ink we would like to know!
The ROM also provides window setting utilities and two new OSWORD calls that allow mode 7 graphics pixels to be read and plotted using the standard graphic co-ordinate system. The latest version includes a graphic dump trigger for dumping screens from games whilst they are running.
Two commands are used to operate the dump routines:
*GIMAGE – This provides a full graphics dump of any graphics mode, plus modes 7 and '8'. There are many optional parameters but you need only specify the parameters you wish to change.

Features available include:

- Vertical and horizontal scaling through all the graphic modes and mode 7
- Rotation of the image produced through 90, 180 and 270 degrees
- Left hand indentation setting
- Screen dump window definition
- Colour grey scaling
- Two tone fast dump
- Special colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered dumps
- User port switched dumps

What does the independent press say!

Practical Electronics, May 1985
"The Dump Out 3 ROM from Watford Electronics represents one of the most sophisticated types of printer dump utilities available for the BBC Micro . . .".

"an extremely sophisticated and powerful dump utility".

"VERDICT – Dump Out 3 ROM has all the facilities which you are ever likely to need for producing printer dumps. The facilities available work extremely well and if printer dumps are something which you require, then this ROM can be recommended to help you to get the best out of your dot matrix printer".

The Micro User Feb. 1985.
"Well, here is that winner"!

"provide(s) some rather sophisticated screen dumps. Producing high resolution paper copies of graphic screens in any (graphics) mode will be the major reason for buying this ROM, and this is where Dump Out 3 performs PAR EXCELLENCE". (Our capitals for their italics.)

"The versatility of *GIMAGE (the graphics dump command) when using these parameters is amazing. Pictures of almost any size, shape, contrast or distortion may be produced without the need for a reducing photocopier or trick photography".

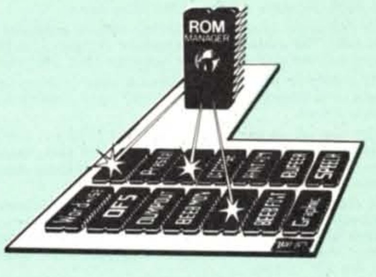
"Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC micro. It is easy to use yet highly versatile, and caters for all BBC screen modes in multitone high resolution printing. Whole, partial, rotated and scaled screens may be dumped to almost any BBC compatible dot matrix printer (see our list at the end of this advert). At £25 it must represent excellent value for money and surely cannot be beaten".

Designed for use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Mannesman Tally etc.
Price including comprehensive manual

£25

ROM MANAGER



Probably the most powerful way of expanding the BBC micro is from the use of Sideways ROMs. One problem faced by the avid ROM collector is that of ROM command clashes. The solution is very simple in the form of the ROM that "Provides comprehensive management of all your installed ROMs". (Quote from BEEBUG November '84.)

Basically, ROM Manager offers you the ability to turn off any installed ROM, or to send any * command to any specific installed ROM. It is said that imitation is the sincerest form of flattery – Acorn's BBC Plus features many of the abilities of this powerful ROM.

Many more facilities available.

SPECIAL OFFER £18

BEEBFONT ROM

BEEBFONT is a remarkable and different concept in BBC software. It allows you to display text on the screen in 13 different styles. It is supplied complete with a Spooler and Editor on 40 or 80 track disc.
(Please write in for technical details).

ONLY **£25**

THE AMX MOUSE

The AMX Mouse needs no introduction. It is simply the best.

Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £65 (carr £1.50)

AMX DESK Package	**£20.00**
AMX UTILITY Package	**£12.00**
AMX SUPERART Package	**£43**
AMX PAGE-MAKER Pack	**£43**
AMX 3D ZICON Disc	**£21**
AMX Database Disc	**£21**
AMX XAM Educational	**£21**

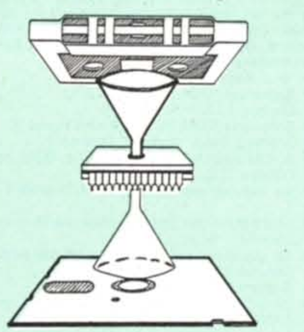
RB12 MARCONI TRACKER BALL

This popular unit is supplied complete with software.

Price: **£50**

TRANSFEROM

(Tape to Disc Utility)



The only TAPE to DISC Utility ROM that works with our Double Density Disc Interface. Not compatible with 1770 DFS.

This advanced and sophisticated utility ROM for the BBC Micro has the following features:

- Fully menu driven for ease of use
- Copes with locked programs
- A very comprehensive built in copying features
- Copies very long adventure games
- Supplied with comprehensive manual

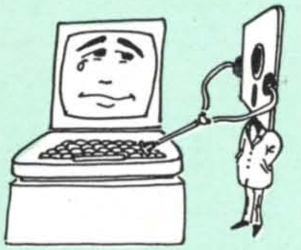
TRANSFEROM is now available in BOTH single and double density versions. The single density version works with both the Acorn and Watford single density DFSs. The double density version works with the Watford DDFS system only.

TRANSFEROM takes your software on tape and saves them onto disc. TRANSFEROM does not stop when one disc is full; you just insert another disc in and carry on with that one! Surely this is the most valuable investment you could make if you have tape software that you wish to transfer to disc! Please specify version required – Single or Double Density.

£25.00

All prices exclusive of VAT

DIAGNOSTICS DISC



The BBC micro is a very complex machine and thus diagnosing a fault can be very difficult. Until now, the only way to discover the nature of a fault was either to find a competent friend with a large degree of patience or to find your nearest dealer and pay him to find out what is wrong.

At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

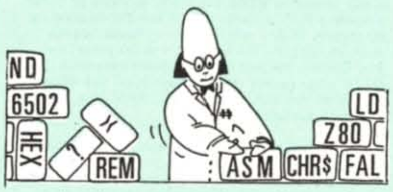
Continued

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

ROMAS

THE CROSS ASSEMBLER AND MACRO EDITOR FOR SERIOUS PROGRAMMERS!



ROMAS is a carefully designed, sophisticated yet simple to use, development system for serious assembly language programmers. Using the BBC as the development system, you can choose your target system from the following processors:

6502, 65C02, Z80, 8085, 8041, 6809 and Z8 P.S. This includes the Acorn 6502 & Z80.

ROMAS features a powerful expression analyser, making complex table easy to generate. To aid in documentation, fully formatted assembly listings may be produced, with full symbol table output at the end.

ROMAS is provided with a powerful cross referancer to produce a listing of all the labels in a given "source" program; this makes it easy to check to see if you are about to duplicate a label.

The Macro Editor

Features of this powerful editor provided with the ROMAS package include:

- Works in all 40 and 80 column screen modes
- Fast load and save speeds
- Continuous line and column number displays
- Search, replace and move; all available in macros
- Command repetition

The ROMAS package includes a comprehensive manual, providing detailed documentation and plenty of examples.

A give away at... **Only £45**

Please specify 40 or 80 track disc when ordering.

ADE

'Systems' complete program development package in a 16K ROM. We are now supplying the new 6502 2nd processor compatible version.

SPECIAL OFFER ONLY **£40**

ULTRACALC 2

The mark 2 version of the BBC Publications' extremely popular electronic spreadsheet ROM.

Only: **£66**

THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of most of your valuable Disc Software. Makes full use of all 8271 (will not run with double density DFSs) facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering.

Only **£20**

ROM-SPELL

"way ahead of any competition"

ROMSPELL
ENGLISH DICTIONARY

ROM-SPELL is probably THE most advanced and fastest spelling checker available for the BBC Micro. Printed below are some extracts from a recent independent review (A&B Computing Nov. '85), which we feel sure will convince you that this is THE only spelling checker worth considering.

"The editing system is very neat and simple, instead of replying to queries and beeps all of the time . . ."

"The other feature which places ROM-SPELL way in front of any competition is the ability to examine the user dictionary, so any spelling mistakes that have found themselves on the disc can be examined and taken out if necessary".

". . . that it is compatible with many of the popular word processors on the market is a good indication that ROM-SPELL is going to be a very popular product indeed".

". . . ROM-SPELL is by far the best spelling checker for the unexpanded BBC B (with or without word processor). It boasts features which are hard to find on conventional spellcheckers on CP/M and MSDOS, namely Spellstar and has a speed/performance ratio of roughly the same as its CP/M cousin. The difference is that the CP/M version would cost the best part of £500".

". . . and with such vital house keeping features as an ambiguous word checker, the ability to edit the user dictionary, a comprehensive manual that is both easy to read and actually ENJOYABLE to learn from, . . . I feel confident that ROM-SPELL will woo the word processing public with no problems at all".

Compatible with: View, Wordwise & Wordwise +.

Don't settle for less, Buy the best.

£25

(Not compatible with 1770 DFS)
(Please state 40 or 80 track disc)

REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

BEEBMON

BEEBMON is the most powerful and versatile machine code monitor from Watford Electronics. BEEBMON offers some superb features specially designed to make the task of understanding and debugging machine code easier; indeed BEEBMON is probably the only product with sufficient power to aid in the debugging of such complex pieces of software as a DFS.

Offering a total emulation mode, BEEBMON can be used to single step through code anywhere in memory. All breakpoints are emulated and the workspace is totally relocatable, allowing for the simulation of all those "awkward" pieces of code.

(Write in for technical details.)

£24

DISASSEMBLER ROM

Discover the hidden secrets of BASIC and the OPERATING SYSTEM with this easy to use progammers tool.

Please write in for technical details.

ONLY **£16**

Continued →

SIDEWAYS ZIF SOCKET

ESCAPE
TAB
CAPS LOCK

Now Watford Electronics brings you a ROM board for small budgets or for those of you who do not wish to open up your Micro frequently. It allows you to change ROMs quickly and efficiently with the minimum of effort – no screws to loosen or keyboard to remove. The unit consists mainly of a zero insertion force (ZIF) socket on a small circuit board which is located into the position of the 'ROM Cartridge' and is connected to one of the internal ROM sockets via a ribbon cable.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.

- The low profile of the socket allows unrestricted access to the keyboard, unlike other cartridge systems. In addition, there are no costly extras, such as ROM cartridges for every new ROM.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)

- BBC B+ compatible. Is ideal for use with KAGA KP810 and GLP printers to allow easy swopping of preprogrammed FONT ROMs.

ONLY **£15** (carr £2)

16K Sideways RAM Modules

This is it! The revolutionary design RAM Module you've been waiting for. Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

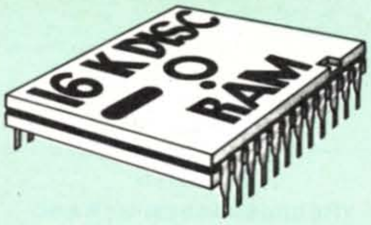
- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Works with any ROM.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional extras

READ and WRITE protect Switches	**£2** each
Battery for Battery Backup	**£3**

All prices exclusive of VAT



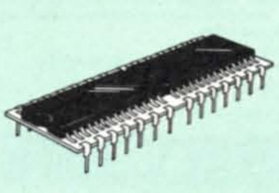
This is the RAM you've been waiting for!! This battery backed up, write protectable 16K sideways RAM board allows you to run from disk every sideways ROM available. Beware of other sideways RAM boards which are not backed up as certain ROMs will not run in these boards even though the RAM can be write protected. The Battery Backup facility allows retention of DATA after power off. On switch on the Micro will think the WATFORD DISC RAM is a ROM. Features available are:

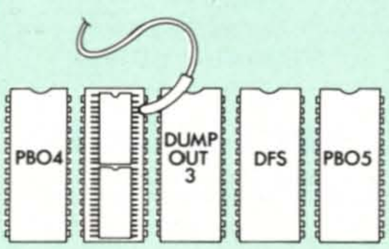
- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- All existing ROMs can be stored on disk and used in DISC RAM.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM in conjunction with our Buffer & Backup ROM.

New Low Price: £30 (carr £2)

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

SOLID STATE 16K SIDEWAYS RAM





This new unit from Watford, which utilises the latest in Static RAM technology, offers 16k of easy-fit sideways RAM in a very compact unit with a footprint no larger than a standard 28pin EPROM. With only a single flying lead terminating in a mini hook-on probe, to fit, (no soldering required) this compact unit works with any BBC Micro with or without a ROM board. ***Compatible with BBC B Plus.*** Like our other 16K RAM Modules, this unit is very simple to fit.

Only **£28** (carr 2)

Supplied complete with comprehensive software on Disc, Operating and fitting instructions.

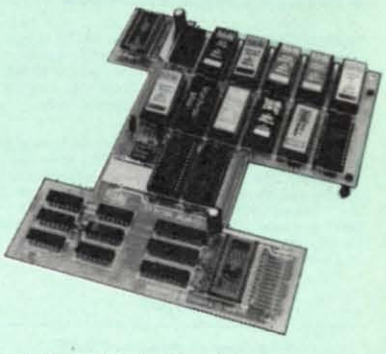
Do you find the 16K Sideways RAM Units confusing? If so, we have compiled this quick questionnaire to help YOU decide which is the best one for you. If the answer to any of the questions is yes, then use the index number to select from the boards below. Options in brackets indicate possible secondary choices.

Do you require:

- Sideways RAM for a BBC B? Choose 1, 2 or 3.
- Sideways RAM for the B+? Choose 1.
- A small, basic module? Choose 1.
- A sideways RAM module for a ROM board? Choose 1, 2 or 3.
- An easy to use utilities disc? Choose 1, 2 or 3.
- More than one module installed at once? Choose 1 or 3.
- To use sideways RAM as a printer buffer? Choose 1 or 3.
- Battery Backup? Choose 2 (3).
- Write protect for RAM (makes ROM look like RAM)? Choose 2 (3).
- Read protect (allows recovery from crashes)? Choose (3).

Key:
1) Solid State 16k Sideways RAM
2) 16k Disc RAM
3) 16k RAM module

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16. Also permissable, are various configurations of RAM (up to 16k) and different sized EPROMs (see below).

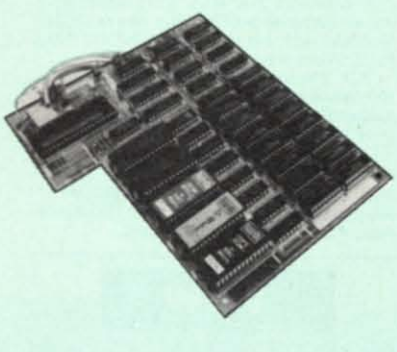
Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 can take the following chips: 2716, 2732, 2764, 27128, 6116, 6264.
- Read protect to make RAM "Vanish"; allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

Watford ROM/RAM CARD

A must for all serious users



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with ALL BBC micros (not BBC Plus).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Can run ANY BBC ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM/RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM/RAM Board.

The ROM/RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, should the user wish to upgrade in the future. Please write in for further details.

INTRODUCTORY PRICES:

● *ROM/RAM card with 32k dynamic RAM*	***£45***
● *ROM/RAM card with 64k dynamic RAM*	***£69***
● *ROM/RAM card with a massive 128k dynamic RAM*	***£109***

(carriage on ROM/RAM Card £3)

OPTIONAL EXTRAS:

● *16k plug-in Static RAM kit*	***£7***
● *Battery backup*	***£3***
● *Read and Write protect switches*	***£2 each***
Complete ROM/RAM board (all options installed)	***£125***

Le Modem

The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World/wide data transfer system.*
- *Auto Dials, Auto Answers, Auto Baud selects and is completely controlled by your Micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELESOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple "*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON/OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- *FREE 3 months subscription to Micronet and FREE registration to MicroLink to start you up.*
- *BBC Master compatible.*
- *BT Approval applied for.*

Price: **£89**
(carr £3)

PROHIBITED from direct or indirect connection to any telecommunication system run by British Telecommunications. Action may be taken against anyone so connecting this apparatus

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

£115
(carr £3)

(Price includes: Nightingale Modem, Commstar ROM pack, Cables & Comprehensive manual)

Nightingale Modem without software	**Only £99**
COMMSTAR ROM package only (P&P on modem £2.00)	**£29**
Auto Dial/Auto Answer Board	**£48**
Auto Dial Utilities Disc	**£9.50**
OBBS Bulletin Software	**£20.00**

THURSDAY LATE OPENING

By popular demand, our retail shop will now be open until 8.00pm. every Thursday.

LOGOTRON LOGO

The popular Logotron Logo in ROM. Recommended by most Education authorities.

Only: £52

Viglen Console Unit

Enhance the appearance and convenience of your BBC Micro with the Viglen console unit.

£42 (carr. £4)

GLENTOP's 3D GRAPHICS

Development System	**£22**

DATAGEM Database

Now compatible with Watford DFS's

Whether you have a single 40 track drive or a Winchester hard disk, this system will make use of ALL your disk space, treating up to 4 drive surfaces as ONE CONTINUOUS FILE.

AMATEURS & PROFESSIONALS

For newcomers to databases as well as seasoned users, DataGem represents an ideal starting point. Structuring your file and layout couldn't be simpler using DataGem's on-screen 'painting' format. You can have up to 62 fields or data items wherever you want them on a scrolling 120 × 120 card. Colours are all definable, and field data and field titles may be separated if required. Data entered may be stored in up to 8 tiers or 'levels', as well as within the whole database file. Scan one level or the whole database for records that match your search parameters, and place them in another data level for later manipulation. DataGem also boasts limited facilities for producing data merged letters, and may be configured as a 62 cell spreadsheet.

£59

BT TELEPHONE CONNECTORS

LJU 1/4A Mini Line Master	**£4.50**
LJU 1/6A Mini Line Slave	**£3.00**
LJU 2/4A Line Master	**£4.00**
LJU 2/6A Line Slave	**£2.50**
LJU 3/4A Flush Master	**£3.95**
LJU 3/6A Flush Slave	**£2.75**
LJU 10/3A Dual Splitter	**£5.50**
4 Way BT Plug	**£0.75**

Versatile **BEEB SPEECH SYNTHESISER** Unit

Beeb Speech Synthesiser

The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	**£51**
CARETAKER Basic Utility	**£27**
Graphics ROM	**£25**
Disc Doctor ROM	**£25**
TERMI	**£27**
COMMUNICATOR	**£58**
SPEECH ROM	**£26**

Wordwise

The most popular Wordprocessor for the BBC Micro.

Special Offer: **£28**

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text/segment area.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS

Supplied on disc. This version requires a WORDWISE-PLUS ROM to be present in the machine. It gives up to 44k of text space on the 6502 2nd processor.

£5

Inter SHEET

The most powerful spreadsheet package available for the BBC Micro. Ultra-fast replication and calculation times help make this the easiest to use. It has received very favourable reviews. Unique 105 column screen mode. Supplied in 2 ROMs.

£40

INTER-CHART

This unique program is the only one of its sort on the market. Accepts data from a variety of sources and plots line graphs, bar charts or pie charts. Up to 16 separate charts may be stored in memory. Built in screen dump for EPSON compatible printers, but can use other printer dump routines.

ONLY: £26

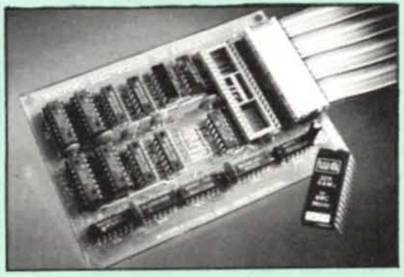
All Prices Exclusive of VAT

GRAPH PAD

With this popular Mk II British Micro's Graph Pad, you can add new dimensions to your computer enjoyment. It helps you to create your own applications programs by the simple use of the Graphpad. Ideal for educational use. Supplied complete with cables, Manual and Software Cassette.

Special Offer £51 (carr £3)

32K SHADOW RAM- Printer Buffer Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B+ or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.
- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Ensure COMPATIBILITY with a vast range of hardware (including our ROM board, the ATPL ROM boards, double density boards, second processors), and software (including BASIC, TOOLKIT, VIEW, WORDWISE (1.20+), WORDWISE-PLUS, Music 500's AMPLE). This is because our board, unlike those of our competitors, is connected to the computer by a ribbon cable and has the power consumption of a couple of ROMs!
- Achieve EASY OPERATION with ROM based software. A large range of commands is available for machine code and BASIC users, including some useful *HELP messages, and a comprehensive manual is supplied free.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only: £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORD PROCESSING DEAL ! ! !

Watford Electronics, already renowned for quality products at discount prices, are offering, for a limited period only, the truly spectacular BARGAIN OF THE YEAR!

A Watford's 32K RAM Card (offering printer buffering and shadow screen RAM facilities) with the well known WORDWISE PLUS Word processor.

32K Shadow RAM Card/Printer Buffer and Wordwise Plus (a very powerful package) for the absolutely astounding price of:

Only £75 (carr £2)

(P.S. For an extra £14, we will include Word-Aid ROM package for the Wordwise Plus, if bought at the same time.)

VIEW

VIEW WORDPROCESSOR 2.1 .... **£39**

VIEW 3.0 ROM

This latest version features automatic relocation with a 6502 second processor and takes full advantage of any shadow memory fitted. BBC B Plus compatible. Supplied complete with Printer Driver Generator tape.

Price: Only **£60**

HI-VIEW

A special version of VIEW designed for use with 6502 2nd Processor. Available on disc, it offers 47K of text memory.

£38

VIEWSHEET (Acornsoft)	**£39**
VIEWSTORE	**£39**

Watford's own Sophisticated VIEW PRINTER DRIVER for Epson FX80 & KAGA KP

Only £10

VIEW DRIVERS FOR JUKI & BROTHER HR15 PRINTERS

Only £10

VIEW/VIEW SHEET PRINTER DRIVER for SILVER REED

(Officially approved by Silver Reed)

Only: £10

OMNIREADER

OCR at a price you can now afford

The manually operated omnireader is preprogrammed to read 4 common type faces – including: KAGA Courier 10, Courier 12, Letter gothic & Prestige Elite. It reads a line of text in about 3 seconds & is ideal for inputting already typed material into wordprocessor packages, such as View or WW, Databases or Spreadsheets. Comes complete with power supply, instruction manual, longrule & Dustcover. Also available on disc for the BBC is a utility program which merges input from the service port with the keyboard thus allowing full editing control whilst using the omnireader. Also included is a Basic program which displays the pixel map image obtained from the omnireader – ideal for doing your own OCR.

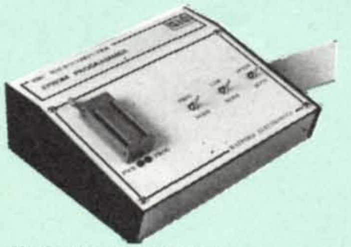
(As seen on the TV programme Micro LIVE)

Price: **£175**

BOOKS (No VAT on Books)

30 Hour BASIC (BBC Micro)	£7.95
40 Best machine Code Routines	£7.95
6502 Assembly Language Program	£19.95
6502 Application	£11.95
6502 Assembly Language Subroutines	£19.95
6502 Development System	£7.50
68000 Assembly Lang. Programming	£19.95
6800 Machine Code Programming	£12.95
6800 Programming the	£22.95
A User Guide to Wordwise Plus	£9.95
A Young persons Guide to BBC Basic	£5.95
Advanced Disc User Guide	£14.95
Advanced BASIC ROM User Guide	£9.95
Advanced Machine Code Technique for BBC	£7.95
Advanced Programming for the BBC Micro	£6.95
Advanced User Guide for BBC Micro	£13.50
Advanced Graphics with BBC	£9.95
Assembly Language Programming on BBC Micro	£11.50
Advanced Programming Techniques for the BBC Micro	£8.95
Adventure into BBC BASIC	£6.95
Applied Assembly Lang. for BBC	£9.95
Assembler Routines for the 6502	£7.95
Assembly Language Programming FOR the BBC Micro	£8.95
Assembly Language Programming on the BBC & Electron	£8.95
Basic Programming on the BBC Micro	£6.95
Basic ROM User Guide	£11.95
Basic User Guide for BBC Micro	£10.00
BBC B+ User Guide	£14.95
BBC BASIC	£5.95
BBC Forth	£7.50
BBC Machine Code Portfolio	£7.95
BBC Micro add on guide	£7.95
BBC Micro Advanced Reference Guide	£10.95
BBC Micro Advanced Programming	£9.95
BBC Micro Book BASIC Sound & Graphics	£7.95
BBC Micro ROM Book	£9.95
BBC Micro **ROM PAGING** System Explained	£2.00
BBC Micro Disc Companion	£8.95
BBC User Guide	£10.00
BBC Wargaming	£8.95
BCPL User Guide	£14
Business Applications on BBC	£7.95
Complete FORTH	£6.95
CP/M - 86 User's Guide	£19.95
CP/M Bible	£16.50
CP/M Handbook with MPM	£9.95
CP/M Plus Handbook	£13.95
CP/M Soul of	£16.50
CP/M The software BUS	£8.95
Creative Animation & Graphics	£7.95
Creative graphics on BBC Micro	£7.50
Disc Drive Projects for Micros	£5.45
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
Disc Programming Techniques	£9.95
Discovering BBC Micro Machine Code	£6.95
Disc System for the BBC Micro	£6.95
Exploring FORTH	£6.95
Filing System & Databases for the BBC Micro	£7.95
FORTH on the BBC Micro	£7.50
Functional Forth for the BBC Micro	£5.95
Graphics for Children	£6.95
Graphs & Charts on BBC Micro	£7.50
Guide to BBC ROM	£9.95
Hackers Handbook	£4.95
Hackers Handbook - New	£6.95
Handbook of Procedure & Functions for the BBC Micro	£6.95
Interfacing & Robotics on BBC	£15.95
Interfacing Your BBC Micro	£8.95
Into View	£4.50
Introduction to COMAL	£9.50
Introduction to LOGO	£6.95
Introducing 'C'	£9.95
Introducing CP/M on the BBC Micro Z80 2nd Processor	£9.95
Introducing LOGO	£5.95
Introduction to FORTH	£8.95
Introduction to PASCAL	£17.95
ISO-PASCAL Reference Manual	£9.95
Let your BBC teach u to program	£5.45
LISP 2nd Edition	£14.95
LISP, A Beginners Guide to	£10.95
Logo Programming	£9.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering CP/M	£17.95
Master Advance Reference Manual	£19.95
Master Reference Manual Part 1	£14.95
Master Reference Manual Part 2	£14.95
Micronet Handbook	£6.95
Programming the 6502	£16.95
Programming the Z80	£19.95
Sencing & Control Projects for BBC	£5.95
S-PASCAL on BBC Micro	£7.50
Structured Basic	£7.95
Structured Prog. with BBC BASIC	£6.50
Termulator Manual	£4.95
The Complete FORTH	£6.95
The Complete Programmer	£5.95
The Epson FX/KAGA PRINTER Commands REVEALED	**£5.95**
Turtle Graphics on BBC Micro	£7.50
Using Floppy Discs with BBC Micro	£5.95
View Guide	£4.50
Viewsheet User Guide	£10
Using BBC Basic	£4.95
Wordstar & CP/M made easy	£7.45
Wordwise Plus Guide	£9.95
Z80 Assembly Language Programming	£19.95

EPROM PROGRAMMER



The Watford Electronics' EPROM programmer for the BBC micro is a high quality self contained package. Programs all popular EPROMs from 2K to 16K: 2716, 2516, 2532, 2564, 2764 and 27128. All manufacturers' specifications have been followed to program EPROMs at the correct speed – wrong timings could destroy your EPROMs. The unit has its own power supply so does not put heavy loads on the BBC power supply as do some other units. Connects directly to the 1MHz bus following all Acorn recommendations on addressing and bus loadings.

SOFTWARE PACKAGE

The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette/disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

Software facilities include:
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
Also included is an automatic system to allow Basic programs to be put in EPROM and accessed through the *ROM filing system. More than one program may be put in an EPROM. All these facilities and more are explained in the comprehensive and clear 15 page manual.

SPECIAL OFFER £69 (£3 carr.)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

BEEB VIDEO DIGITISER

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£110 (Carr. £3)

(Price includes: Digitiser Unit, Software in ROM & a Comprehensive Manual)

Magazine Maker

(As seen on TV)

A combination of the AMX Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within AMX Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£129.00** (carr. £3)

Continued →

OFFICE MASTER

Office Master

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock value, current gross margin, cost of bringing stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21**

(Cassette or Disc)

Money Management

This disc based software allows individual transactions to be stored and retrieved for upto 5 Bank a/c and 5 Loan accounts.

Price: Only **£11**

L.B.O. Rom

Life & Business Organiser

Features include:

- Automatic reminder of entries overdue for attention.
- One week's advance notice of forthcoming events.
- Urgent notice board.
- Creation of categories of entries; e.g. bills, birthdays, letters to be written, notepad etc.
- Sorting of appointments by date and time of day.
- Month AND week's summary at a glance, indicating time booked and free.
- Single entry of a RANGE of events and updating of regular happenings.
- Super search facility to call any event by any related word or part word.
- Month by month preview of all forthcoming events.
- Built-in intelligent calendar.
- All data saved to disk.
- Full printer support.
- Easy to follow documentation.

Use LBO to organise your life from today until 1999! It can handle literally hundreds of multi-line messages, as many as you are ever likely to need. Despite the very wide range of facilities offered, this professional program is VERY easy to use and requires absolutely NO knowledge of computers. A vital aid to your everyday life, LBO is GREAT FUN TO USE!

Price only: £17

(Also available on DISK)

D D D Suite Integrated Software System

-BASE **£25**
-CALC **£25**
-PLOT **£25**
COMBO PACK All 3 together **£56**

OFFICE MATE

Office Mate

- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS
- WORD PROCESSOR

Database – Set up a computerised "card index" system and add record/data to the file your way. Features include search, sort, mathematical calculations, printer routines, data summaries, etc.

SPREADSHEET – Offers a wide range of invaluable calculation and editing features. Beebplot will take files created by Beebcalc to provide data portrayal in graph, histogram or pie chart format.

BEEBPLOT – Provides an easily assimilated visual representation of numerical data.

WORDPROCESSOR – Provides many routines found in large and expensive packages.

OFFICE MATE Only £10

(Cassette or Disc)

ARIES CORNER

Aries Computers was the first company to commercially market what is now known as SHADOW RAM. As part of it's continued expansion policy, Watford Electronics is proud to announce that the Aries range is now available exclusively from Watford Electronics and their dealers.

The Aries range, designed by experts offers you the solution to your upgrade nightmares. All the Aries products are compatible with double density disc controllers, modems, second processors, ECONET, hard discs, EPROM programmers and of course, other members of the Aries family and most of the much wider Watford family (some products advertised here perform identical functions and hence cannot be used together). Several major companies now test all their products to ensure compatibility with the Aries B20 & B32.

In quality of construction, the Aries range sits alongside the Watford range in setting a standard against which others are judged. Custom made connectors eliminate the damage to the BBC machine caused by inferior products.

The Aries B-32 Shadow RAM Card

18 months of intensive research and development have produced a worthy successor to the widely acclaimed Aries-B20; the revolutionary Aries-B32. This 'second generation' expansion board features 32k of RAM and a 16k ROM socket.

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus and many othr applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: B-32 **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries B-20 and the Aries B-32. For the business user or educationalist, the compact and secure internal fitting is ideal, with the ROM board tucked neatly inside the lid where it will not cause overheating problems. The serious software developer and the hobbyist may prefer to mount the board externally, giving instant access to the sockets for experimental purposes. A zero-insertion force (ZIF) sofket may be fitted to the board to enhance this mode of operation.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on he board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable 'mother board' which carries the extension ROM sockets and a small 'base board' on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have an B32 or B20, a small adaptor module (the Aries B-12C) is available at a nominal cost. The 6264 static RAM chips used to provide the sideways RAM are advertised elsewhere in our advert.

Price:
Aries B-12 **£40.** Aries B-12C **£5**

THE ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

Aries B-488 Unit: **£238** (Carr £3)

THE ARIES RANGE HARDWARE REQUIREMENTS

Aries B-32 – BBC B, MOS 1.20, hardware plugs into CPU socket.
Aries B-12 – BBC B, MOS 1.20, hardware plugs into all four sideways ROM sockets and connects to the B32 or the B20. The adaptor Aries B-12C module is necessary where these are not fitted.
Aries B-488 BBC B, MOS 1.20, Hardware plugs into 1MHz Bus.

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£16
Delta 14B Single Joystick	£12
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc/Tape	£7

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

Price: **£2**

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£8.75**

Replacement FLEXIBLE KEYBOARD CONNECTOR

A 'Keyboard to Micro' replacement jumper lead.

£4

ATTACHE CARRYING CASE for BBC Micro

The Attache carrying case is attractively finished in mottled antique brown leatherette. The case is made of tough plywood, providing a very solid and safe way to carry your BBC micro. There is room provided to fit all the leads necessary behind the computer and manuals in the front. Locks supplied with two keys. Price **£13** (£2 carr.)

DATA CASSETTES

Top grade tested C12 Data cassettes supplied in library cases **35p** each; 10 for **£3.20.**

SPARES for BBC Micro

Keyboard	**£46;**	Keystrip	£2
UHF Modulator	**£4;**	Case	£25
Speaker Grill	**£1;**	Speaker	£2
		Keyswitch	£2

8way DIP SWITCH **£0.85**

CONNECTING LEADS

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug	
to 5 pin DIN Plug + 1 Jack Plug	£2.00
to 3 pin DIN Plug + 1 Jack Plug	£2.00
to 7 pin DIN Plug	£2.50
to 3 Jack Plugs	£2.00
6 pin DIN to 6 pin DIN Plug (RGB)	£2.50

DISC DRIVE POWER LEADS

Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

DISC DRIVE INTERFACE LEADS

BBC to Disc Drives Ribbon Cable

Single **£4** Twin **£6**

MISCELLANEOUS CONNECTORS

	Plugs	Sockets
RGB (6 PIN DIN)	30p	45p
RS423 (5 pin Domino)	40p	50p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	20p	30p
Paddles (15 pin 'D')	110p	215p
BBC Power Plug 6 way	80p	–
Disc Drive Plug 4 way	75p	–
BBC Power Socket 6 way	80p	–

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234/33383

النور

ARABIC ROM

for the BBC Micro

The ALNOOR ARABIC ROM converts your BBC into a bilingual computer. New keytops provide both English and Arabic symbols. Two sets of Arabic symbols are provided for use in either context sensitive or insensitive operation.

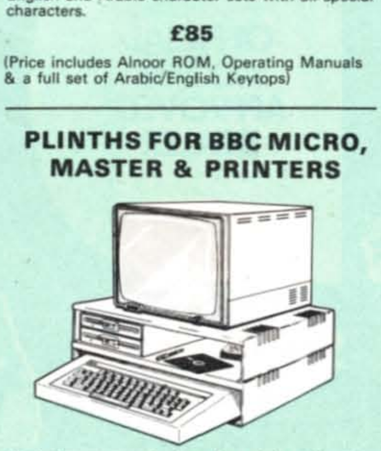
20, 40 and 80 column operation. Compatible with ASMO (449). English/Arabic printer interface software. Numeric entry from either left or right of number. Communications software to send or receive 7 or 8 bit data.

Different shapes of Vowels (e.g. Shadda, Fatha, etc). Different shapes of Hamza. Full English and Arabic character sets with all special characters.

£85

(Price includes Alnoor ROM, Operating Manuals & a full set of Arabic/English Keytops)

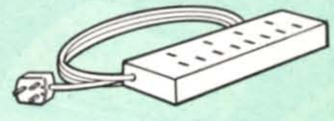
PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11**	(carr. £1.50)
DOUBLE BBC PLINTH	**£20**	(carr. £2.00)
PRINTER PLINTH	**£10**	(carr. £1.50)
SINGLE MASTER PLINTH	**£14**	(carr £1.50)
DOUBLE MASTER PLINTH	**£25**	(carr £2.00)

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug.

£9.50 (carr £1.50)

ACORN MUSIC 500

The Acorn Music 500 System is probably the most powerful piece of music generating hardware available for the BBC Micro.

£95 *(carr £4)*

28 pin ZIF SOCKET (Textool) **£6.95**

28pin DIL HEADER PLUG

SOLDER type	£1.50
IDC CRIMP type	£1.95

RIBBON CABLE

28way **55p/ft;** 34way **60p/ft.**

SOLDERING IRON

Soldering Iron (Antex 17 Watt), Ideal for electronics PCB work	£6
Soldering Iron Stand	£2
18 SWG Solder in dispenser	£1
22 SWG Solder in dispenser	£1.50

CHIP SHOP

2764-250nS	£2.00	SAA5050	£8.75
27128-250nS	£3.00	UPD7002	£4.40
4013	60p	**ASSORTED ROMS**	
4020	£0.90		
4816 RAM	£1.00	ACORN BASIC 2	£19
		ACORN ADFS	£25
6264LP-8K RAM	£3.75	ACORN DNFS	£17
6502A CPU	£5	Acorn OS 1.2	£6
65C02 CMOS	£10.00	Acorn BCPL	£42
6512A	£10.00	Basic Editor	£25
6522	£3.40	Acorn COMAL	£36
6522A	£5.00	Acorn FORTH	£32
6845SP	£6.00	Acorn Graphics	£25
7438	40p	Acorn LISP	£35
74LS00	25p	Acorn LOGO	£42
74LS04	25p	ISO Pascal	£42
74LS10	25p	ICON Master	£28
74LS123	80p	Logotron LOGO	£55
74LS163	70p	Micro Prolog	£64
74LS244	80p	Microtext ROM	£48
74LS245	£1.00	ROMIT	£29
74LS373	£1.00	Serial ULA	£13
74LS393	£1.00	Video ULA	£15
8271	£36	TERMULATOR	£25
DS3691	£3.50	MUROM	£21
DS88LS120	£3.00	SLEUTH ROM	£24
LM324	£0.45	STUDIO 8 Disc	£18
SN76489	£5.50	Toolkit Plus	£31

ACORN'S GRAPHICS EXTENSION ROM
GXR-B £21.00 GXR-B+ £22.00

Prices subject to change without notice and available on request. All offers subject to avellibility.

MAIL ORDER AND RETAIL SHOP. TRADE AND EXPORT INQUIRIES WELCOME.
GOVERNMENT AND EDUCATIONAL ESTABLISHMENTS OFFICIAL ORDERS ACCEPTED.

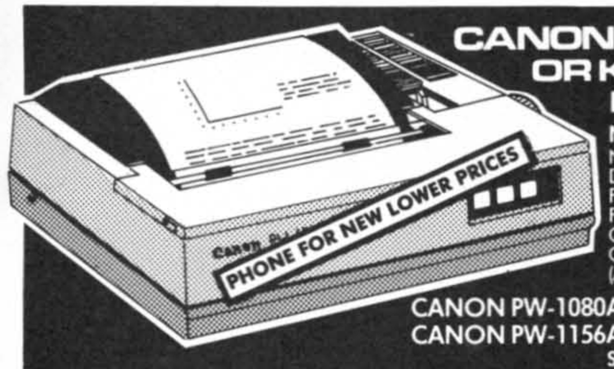
CARRIAGE: Unless stated otherwise, minimum £1 on all orders; £2 on larger items and on bulkier items, £7 Securicor charge applies. Overseas orders are charged at cost.

VAT: UK customers please add 15% VAT to cost incl. Carriage.

SHOP HOURS: 9.00am to 6.00pm. Monday to Saturday. (Ample Free Car Parking Spaces)

Watford Electronics

JESSA HOUSE, 250, Lower High Street, WATFORD, ENGLAND
Telephone: (0923) 37774; Telex: 8956095 WATFRD
Credit Card Orders ACCESS or VISA Telephone: (0923) 50234/33383


PHONE FOR NEW LOWER PRICES
Canon

CANON PW-1080A OR KAGA TAXAN KP810 (10% slower)

NEAR LETTER QUALITY PRINTER
NLQ Mode 23 × 18 Matrix: 27 cps
Draft Mode 11 × 9 Matrix: 160 cps
Full range of Epson FX 80 Print Codes
Friction & Tractor Feed
Centronics Interface Standard
CANON PW-1156A Available
(Accepts 17" Paper)

CANON PW-1080A + VAT
CANON PW-1156A + VAT
PHONE FOR NEW LOWER PRICES
See below for Printerpack prices

PHONE FOR NEW LOWER PRICES

C.J.E. MICRO'S BBC PRINTERPACKS

For Star, Canon & Juki Printers include:
1. The Printer
2. Next Working Day Delivery
3. Cable to the BBC 1.25 Metres
4. Screen Dump Program (M/C Source)
5. Text Dump Program
6. Function Key set up Program.
7. Function Key Label Printing Program.
8. VIEW Printer Driver
9. 100 Sheets of Paper
10. Mains Plug with 3 Amp Fuse
11. Booklet giving details of using the printer with a BBC
12. Character Defining Program for Downloadable-character-set (draft mode)

CANON PW-1080A	**BBC PRINTER PACK £ inc VAT**
CANON PW-1156A	**BBC PRINTER PACK**
JUKI 6100	**BBC PRINTER PACK**
STAR SG10	**BBC PRINTER PACK £295 inc**

PHONE FOR NEW LOWER PRICES

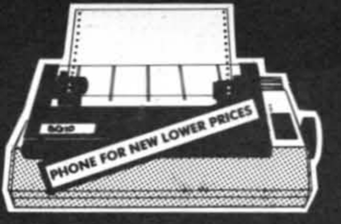
Low Prices

OFFICIAL ACORN APPROVED DEALER

JUKI 6100

One Year Warranty
20 CPS: BiDirectional & Logic Seeking
10, 12, 15 & Proportional Spacing
Wordstar Compatible
2K Buffer; 13 Inch Platen
Underline; Backspace + Lots more
Centronics Interface Standard
RS 232 Interface £54.00 + VAT Extra
Tractor Feed £119 + VAT Extra
Single Sheet Feeder £199 + VAT Extra
JUKI 6100 + VAT =
See left for Printerpack prices

RING FOR SAMPLE PRINTOUT, FULL SPECIFICATIONS & LATEST PRICES


SG10
PHONE FOR NEW LOWER PRICES

STAR SG10

NEAR LETTER QUALITY

NLQ Mode 17 × 11 Matrix
True Descenders 9 × 9 Matrix
120 CPS Bidirectional & Logic Seeking
40, 48, 68, 80, 96, 136 cpl
Italics, Emphasized, Double strike
Super & Sub Scripts
Downloadable Character Set
Hi-Resolution & Block Graphics
Friction or Tractor Feed
10" Carriage
Centronics Interface Standard
RS232 Int. £58.00 + Vat Extra

See above for Printerpack prices

STAR SG10
~~£270.00~~
inc. VAT

Top Service

JUKI 5510
NLQ
180cps
£265.00
inc. VAT.
Written details on request.

FONTAID

NLQ Designer for Canon and Taxan Kaga NLQ Printers.

Design your own NLQ fonts or 'download' one of our 20+ predefined fonts. The FONTAID disk includes the following type styles:
Square, Outline, Gothic, Computer Type Style, Bold, Shadow, and Broadway.

Additional Disk 'A' includes:
Greek/Maths, Script, Proportional Spacing, Plain, Handwriting and 2 styles of (Elite, Condensed, Super Condensed).

FONTAID requires 6264 RAM Chip in printer

FONTAID (BBC)	**£30.00**
FONTAID (BBC) with 6264 RAM	**£36.00**
FONTAID Additional Disk 'A'	**£15.00**

Please state 40 or 80 track when ordering.
ROMS of individual fonts are available and can be used with any computer.

FONT ROMS	**£18.00 each**
P & P on FONTAID	**£1.00**

Please phone for FONTAID leaflet and demonstration print out.

Coming Soon MULIT-FONT NLQ printing for Epson MX/RX/FX/LX and Epson compatibles.
Design your own font or use supplied predefined font.

Please phone for latest details.

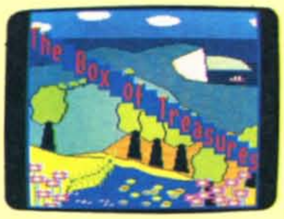
EXPORT ORDERS WELCOME
VAT INCLUDED WHERE APPLICABLE
PHONE/CREDIT CARD ORDERS WELCOME
Postage 50p per order or as stated
Next day Delivery for Printers/Disk Drives £8.00
FULL RANGE OF CONNECTORS & CABLES AVAILABLE
PRICE LIST ON REQUEST

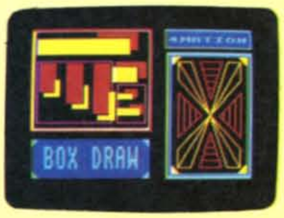
CJE micros
Dept MU7, 78 Brighton Road, Worthing
W. Sussex BN11 2EN (0903) 213900

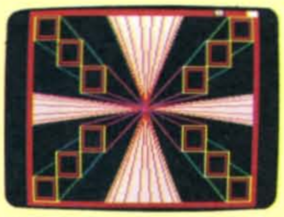
NEW COLOUR JUKI NLQ PRINTER NOW IN STOCK £450.00 inc VAT
Please phone for details

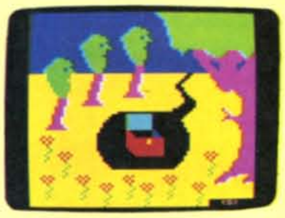
PRINT QUALITY

Boxes keep young students engrossed









Program: Box of Treasures
Price: £26.45 (disc only)
Supplier: 4mation, Linden Lea, Rock Park, Barnstaple, Devon EX32 9AQ. Tel: 0271 45566

BOX of Treasures contains five programs related to the theme of boxes, though each can be used in a variety of situations.

The Adventure uses excellent animated Mode 7 graphics for 15 locations on a 3 × 5 grid. You explore to discover your task, but the idea is to rescue Henry, find the magician and choose from three possible endings.

There are no red herrings, blind alleys or deaths. Children thought it superb, apart from the cursor controls being the wrong way round, as in pressing the up key to move down.

Box Draw produces complex eight colour designs by drawing up to 100 rectangles. You can fill in, half fill, outline or delete, the scale can be altered and picture position changed.

Blank is a most useful utility with endless applications – you can design forms containing up to 40 vertical lines, 40 horizontal lines and 30 text strings in a choice of three line thicknesses and two text heights.

Make-a-Box can be used as an introduction to a boxes project, or simply to stimulate the imagination.

Choose the characteristics and details of a box, and the design is drawn on screen.

The two former programs have editing facilities and the results of all three can be saved, loaded or dumped to a printer.

Create is the weakest part of an excellent package. Stories can be created with static or animated Mode 7 illustrations, but producing anything worthwhile is time consuming.

The program is not particularly user-friendly and there are several error trapping bugs.

Frequent disc changeovers are required and the program hangs up if a child accidentally inserts the data disc instead of the program disc, and all data is lost.

Also the option of deleting a picture from a set does not work.

Two Epson screen dumps, five example files and a 55 minute audio tape of three stories are also included in this first class package.

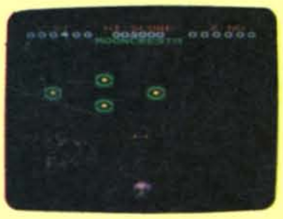
Six information booklets provide a wealth of follow-up ideas to stimulate work across the curriculum away from the computer.

This package is different from previous 4mation products, but you will quickly recognise its value when you use it. Despite my criticisms of Create, I would strongly recommend it to any class teacher.

Jim McHugh

Sound	*8*
Graphics	*10*
Educational Value	*10*
Value	*10*
Overall	*10*

A shoot-out to give the keys some stick



Program: Moon Cresta
Price: £7.95 (cassette), £9.95 (disc)
Supplier: Incentive, 54 London Street, Reading RG1 4SQ. Tel: 0734 591678

WITH software houses currently tending to prefer levels and ladders games and multi-screen maze adventures, it's nice now and again to get back to a real hectic key bashing shoot-out.

With this new release from Incentive that's just what you'll let yourself in for.

The original version of this game was very popular in the arcades when Defender was just arriving on the scene, and it's a reasonably faithful representation of it, even down to the catchy fanfare.

Against a backdrop of falling stars you arrive on the scene in a three stage rocket. Immediately stages two and three drop back out of sight to be on stand by, and you are let loose in only the nose section, stage one. This has a single laser cannon, and you use it to see off wave after wave of alien nasties as you dodge left and right across the screen trying to avoid contact with them.

Should you emerge successfully from four waves of attacks you move on to the first docking stage.

Here you must try to join with stage two of your ship, the object being to continue the fray with this stage attached. Fail and you must carry on with stage two, as your original ship explodes in fragments.

Whether using stages one and two, or just stage two on its own, a docking exercise with stage three awaits should you survive four more waves of aliens.

This stage also has two forward facing lasers further outboard providing a possible total of five should you dock successfully.

All the lasers fire virtually simultaneously with three rapid presses of a single key and this extra firepower is a situation to be achieved as often as possible.

There are 10 waves of aliens, with pairs of waves virtually identical, the only difference being their colour. For example, waves one and two are large swirling sprites looking rather like enormous eyelashes.

You can only destroy half of each alien when you hit it; half remains to carry on the fight, and they have the un-nerving habit of sometimes going off the bottom of the screen and approaching from the rear. One touch from these and you explode.

Wave 5 and 6 are devious beasts and caused me a lot of heartache. They dart around the screen erratically and hyperspace at random, re-appearing wherever suits them.

They sometimes materialise over your ship's position, resulting in an immediate explosion and the loss of a ship. There's not a lot you can do about this and it's the only part of the game I disliked.

There's a reasonably safe zone to the extreme left and right of the screen, but it cramps your style to stay there.

The game has many of the extras you would expect from first class software – user-definable keys, a joystick option, one or two players, and a facility to turn off the well used sound.

It's also great fun to play and extremely addictive, but I don't think it is likely to leap to the top of the charts.

David Andrews

Sound	*8*
Graphics	*9*
Playability	*9*
Value	*9*
Overall	*9*

Triple helping of blockbusters

Program: Cosmic Battlezones
Price: £9.95
Supplier: Ultimate Play the Game, Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Tel: 021-359 3020

THIS is a compilation tape containing three of Ultimate's earlier blockbusters.

The first offering is Jetpac, a tale of spaceship construction on a hostile planet.

Not being a wealthy spaceman you cannot afford a ready-built ship, so you order a kit from the Acme Interstellar Transport Company.

They are obviously a bit of a cowboy outfit as they deliver each section of the ship by dropping it from orbit.

Your task is to fly around using a jetpac and construct your ship. Unfortunately the weather is not too good and everything must be done in the midst of a meteor storm.

The title tune is excellent, the graphics large and colourful and the game is great fun to play.

Game number two is called Lunar Jetman. The Acme rocket disintegrates while orbiting the moon and you are forced to make a crash landing. In this game you take the wheel of a lunar rover and try your hand at rallying on the moon.

Upset by the intrusion, the moon's inhabitants activate their defence systems. You must therefore destroy every missile base before an attack upon the Earth takes place.

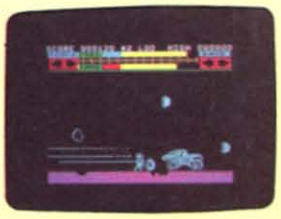
Once again we have a combination of large colourful sprites and a fast and furious zap and blast game.

Alien 8, the third offering, is aimed at the more intelligent gamester. The game incorporates Ultimate's now famous Filmation graphic effects. These consist of single colour, high resolution, three dimensional characters and backgrounds.

A huge starship contains the complete knowledge and a few chosen survivors of a dying planet.

As the ship nears its destination it slows from hyperwarp speed. Unfortunately the defence systems have failed and the craft is open to attack from alien life forms.

Alien 8 is the ship's robotic caretaker who must repair the damaged life support systems and activate the cryogenic chambers in which the crew members are frozen. Each room on the starship contains a puzzle of some sort based around an object which may or may not be useful.



It's a game to keep the keenest of minds absorbed for hours.

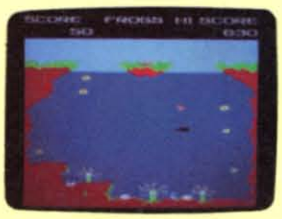
The Cosmic Battlezone compilation should appeal to both arcade addicts and puzzle solvers alike. And what's more it's excellent value for money.

Steve Brook

Sound	7
Graphics	9
Playability	8
Value	9
Overall	8

A bargain in the pond

Program: Savage Pond
Price: £2.99
Supplier: Bug-Byte, Liberty House, 222 Regent Street, London W1R 7DB. Tel: 01-439 0666



TO most people a frog is a small green slimy amphibian which sits lazily on a lily pad devouring passing flies. I too had this impression until I tried my hand at the tadpole survival course, otherwise known as the Savage Pond.

The screen displays a cross sectional view of the pond. When the game begins the pond is quite barren except for a handful of hydra on the bottom.

Having emerged from one of three eggs you begin to stuff yourself with the nutritious amoebae which float in water.

These are useful for gaining points, but do little to aid your progress towards becoming a frog.

Froghood is achieved by consuming the worms which drift from the surface to the bottom. For every five worms consumed you take a step towards maturity. Nine such steps and you become a frog.

Unfortunately for our wriggling buddy, life is not a bed of lilies. Apart from the deadly hydra you must also cope with eggs dropped by passing dragonflies.

It is imperative that these are consumed before they reach the bottom because if they are allowed to hatch you will meet your maker at the jaws of a dragon fly larva.

For each step you take towards maturity a new hazard is introduced to the pond.

These take the form of jellyfish, spiders, and even radioactive waste.

Savage Pond was reviewed in this magazine over 18 months ago and received a very favourable reception. It has now been re-released at less than half the price and is therefore a bargain not to be missed.

Carol Barrow

Sound	7
Graphics	7
Playability	8
Value	8
Overall	8

Lost in the translation

Program: Bruce Lee
Price: £9.95
Supplier: US Gold, Parkway Industrial Estate, Heneage Street, Birmingham B7 4LY. Tel: 021-359 3020

DURING my teenage years Kung Fu was all the rage, and Bruce Lee was its greatest exponent. I'd seen Enter the Dragon so many times that I knew each scream and yell backwards.

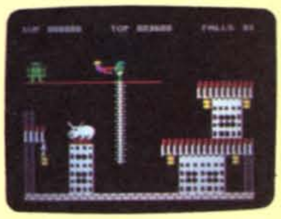
It was therefore with great excitement that I loaded up Bruce Lee from US Gold.

Lee, under your control, must penetrate the fortress of an evil wizard in order to claim his fortune. By destroying the wizard you will earn immortality and fabulous wealth.

The castle is constructed in the form of a series of ladders and levels-style screens. Bruce must run around these collecting the Chinese lanterns which hang from the buildings.

Only when every lantern has been collected will other gateways open, allowing access to new rooms.

As lantern gathering is a bit of a namby-pamby task for our hero, a few bad guys are thrown in for light relief. These can be rendered unconscious with a flying kick or punch.



It is advisable to get the first punch in because once you hit the floor you are likely to lose several lives.

Your inscrutable opponent has a habit of kicking you as you get to your feet.

The graphics for both the characters and the background are very crude, containing little detail and being rather angular in design.

The animation is poor, with visible flicker evident on most movements of the characters. Use of sound is negligible and there is no high score table.

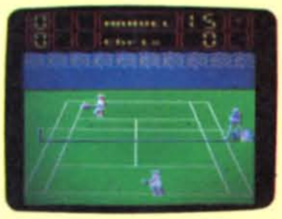
Once again US Gold has proved it can convert a first class Commodore 64 game into a third rate BBC version.

Jon Revis

Sound	5
Graphics	5
Playability	5
Value	5
Overall	5

Is there a Becker in the box?

Program: Tennis
Price: £2.99
Supplier: Bug-Byte, Liberty House, 222 Regent Street, London W1R 7DB. Tel: 01-439 0666



SHOULD you be one of the many thousands of people who spend Wimbledon fortnight glued to the TV set you may have considered trying a computer simulation.

Bug-Byte have just released one such program, though I doubt whether it's destined to be a winner.

You have the option of playing one or three sets with either four or six games per set.

Control is via keyboard or joystick and your opponent is always the computer – you cannot challenge a friend.

This is a pity as the computer provides such stiff opposition that you will normally only win one or two points during a complete set.

The court is drawn with perspective going into your screen, the computer always being at the top of the screen.

Serving is performed by pressing the fire button, but do remember to keep your feet behind the baseline or you will be foot faulted.

Your player can travel left, right, and up and down the court, and balls can either be volleyed or taken as groundstrokes.

When volleying from the net I would suggest that you do not stand too close as you will tend to hit the ball out of court.

I can only assume that the angle of the shot which you play is determined by your position in relation to the ball, though I didn't find that this made too much difference.

The ball's flight and its associated shadow, was relatively smooth, although on several occasions it vanished for a fraction of a second in mid-flight.

The characters representing the players are large, angular and rather crude. The best part of the screen is the scoreboard where electronic style numbers display sets, points, and server.

Had the game employed a user selectable skill option it would probably have had more lasting appeal. But in its present form I feel it would soon be abandoned by a thoroughly demoralised player.

James Riddell

Sound	*6*
Graphics	*6*
Playability	*6*
Value	*6*
Overall	*6*

Useful practice for shakey spellers

Program: Better Spelling
Price: £9.95 (cassette), £12.95 (disc)
Supplier: School Software, Meadowvale Estate, Raheen, Limerick, Ireland. Tel: 010-353 61 27994

BETTER Spelling is a program designed for 9 to 14-year-olds to reinforce the various rules of spelling.

I would assume these rules have already been taught at school, in which case this program is ideal for giving pupils more practice in applying them.

It is divided into 11 sections, each demonstrating a certain spelling rule or grouping words which have irregular plurals or past tenses, and so on.

The first section, for instance, covers plurals ending in ies and eys, such as daisies and donkeys. The rule is clearly written, as are all the instructions throughout.

In this exercise the singular word is given and the pupil is asked to type in the plural.

A correct answer merits a "Well done" and a happy note of music, while an incorrect response receives a "Hard luck" plus a suitable low note and the correct answer is given to the pupil.

I would have liked to have seen the questions that were answered incorrectly repeated at the end of each exercise and repeated again until the correct answer was given. This would reinforce the correct spelling.

The number of correct and incorrect answers is shown on the screen throughout the exercise, but at the end only the number of wrong answers is given.

Why not show the number of correct answers as well, and perhaps even the percentage accuracy?

The first exercise has 20 words. Others have as many as 50 words or as few as nine.

The first and second exercises are relatively easy – they are all fairly common words which most top junior children should know.

The third exercise on irregular plurals – larvae, radii, emphases and so on – is much more difficult. It helps if you know some Latin.

The sections on prefixes and suffixes require some vocabulary knowledge – the pupil has to choose the correct prefix or suffix from a given list and add these to the base words.

The last section on common spelling errors is very useful. It presents you with a sentence which you must complete by choosing the correctly spelt word from the list of options.

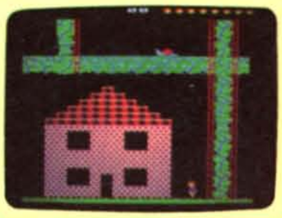
I'm sure more words could have been included in this section, but I was glad to see all the common ones, especially "there, their, they're" and "of, off".

Finally there is the option of having sound or not. I didn't like to hear a little bleep or varying pitch every time I pressed a key. In a crowded classroom this might be annoying.

This is a useful program to give pupils who need more practice in applying spelling rules.

Carole Sillers

Sound	*4*
Graphics	*N/A*
Educational Value	*8*
Value	*8*
Overall	*7*



Dodge the giant

Program: Jack Attac
Price: £2.99
Supplier: Bug-Byte, Liberty House, 222 Regent Street, London W1R 7DB. Tel: 01-439 0666

ONCE upon a time there was a young man named Jack who had a beautiful girlfriend called Jill – until the local giant incarcerated her in his castle.

Being a brave sort of chap Jack, decided to enter the castle to attempt a rescue.

The castle takes the form of a 45 screen maze which you must negotiate in order to find the key which will unlock Jill's dungeon.

Different areas are sealed off by coloured doors, unlocked by coloured keys which are to be found around the castle.

I don't know if the giant is a greengrocer in his spare time but the castle is littered with pieces of fruit. Every one must be collected before you are allowed to free Jill.

As soon as you have released your beloved, the giant will awaken. You must therefore escape from the castle within the next two minutes or you've got big problems.

The 45 screens do not need to be completed in sequence, and you are free to wander from place to place as you seek the next key.

Each screen is big, colourful and normally patrolled by a nicely detailed bad guy.

There are also secret passages which can take you from one section to another without the need for a key.

Jack Attac is a well written, fun to play, and sensibly priced program.

James Riddell

Sound	*7*
Graphics	*7*
Playability	*8*
Value	*8*
Overall	*8*

21st. Software (ELECTRON VERSIONS AVAILABLE)

PRESENTS A SELECTION OF HARDWARE, UTILITIES & SOFTWARE FOR THE BBC MICRO

NEW INCENTIVE SOFTWARE'S
MOON CRESTA
Cass. £7.95 OUR £6.95
Disc £9.95 OUR £8.95
THE GRAPHIC ADV. CREATOR
Cass. £22.95 OUR £20.45
Disc £27.95 OUR £25.00

NEW US GOLD'S
REBEL PLANET
(Cass. text adv.)
R.R.P. £7.95 OUR £6.95
QUESTPROBE
(Cass. text adv.)
R.R.P. £7.95 OUR £6.95

NEW US GOLD'S
BOUNTY BOB STRIKES BACK
Cass. £9.95 OUR £8.95
SPY HUNTER
Cass. £9.95 OUR £8.95

DR SOFT'S
DOUBLE PHANTOM
2 BBC MICRO'S WIRED FOR 1ST
MULTI-USER SIMULATION
R.R.P. £19.95 OUR PRICE £18.65
(Includes Lead)
Disc only

GEMINI'S
OFFICE MATE
Cass. or Disc £12.00 OUR PRICE £11.00
OFFICE MASTER
Cass. or Disc £25.00 OUR PRICE £22.50
MONEY MANAGEMENT
Disc R.R.P. £12.95 OUR PRICE £11.65

MINI OFFICE II

	R.R.P.	OUR PRICE
Cass.	£14.95	£12.95
5¼"	£16.95	£14.95
3"	£19.95	£17.95

NOW AVAILABLE
ACORNSOFT'S
VIEWSPELL ROM
R.R.P. £39.95
OUR PRICE £35.55

SUPERIOR SOFTWARE
SUPER 3 PACK (BBC)
3 CASSETTES
MOON MISSION
BMX ON THE MOON
SPITFIRE COMMAND
GREAT VALUE ALL 3 FOR JUST £6.95

NEW ALLIGATA'S

	R.R.P.	OUR PRICE
DECATHLON (disc)	£9.95	£8.95
WHO DARES WINS II (disc)	£9.95	£8.95
QUIZ QUEST (disc)	£9.95	£8.95

VINE MICROS ROM SOFTWARE
ADDCOM
R.R.P. £28.00 OUR PRICE £26.00
REPLAY
R.R.P. £35.00 OUR PRICE £31.50

NEW ELITES
BOMB JACK
Cass. £9.95 OUR £8.95
Disc £14.95 OUR £13.65
AIRWOLF
Cass. £9.95 OUR £8.95
Disc £14.95 OUR £13.65

	R.R.P.	OUR PRICE
AARDVAAK SOFTWARE		
Zalaga	7.95	6.95
Frak	8.95	7.95
ACORNSOFT		
Elite (cas.)	14.95	12.95
Revs (cas.)	14.95	12.95
Revs (disc)	17.95	15.85
Revs 4 tracks (cass)	9.95	8.95
Revs 4 tracks (disc)	12.95	11.65
Majic Mushrooms (cas.)	12.95	11.65
Majic Mushrooms (disc)	14.95	13.45
Aviator (cas.)	14.95	13.25
Aviator (disc)	17.65	15.25
Maze (cas.)	9.95	8.95
Maze (disc)	11.50	10.45
Acheton (disc)	17.65	15.95
Firebug (cas.)	9.95	8.95
Firebug (disc)	11.50	10.45
Snooker (cas.)	9.95	8.95
Snooker (disc)	11.50	10.50
Labyrinth (cas.)	9.95	8.95
Gateway to Karos (cas.)	9.95	8.95
Kingdom of Hamil (cas.)	9.95	8.95
ACORNSOFT/BES		
Happy Letters	8.95	7.95
Timeman One	8.95	7.95
Happy Numbers	8.95	7.95
Wordhang	8.95	7.95
Osprey	9.95	8.95
ACORN/LINKWORD		
German	14.95	12.95
French	14.95	12.95
Italian	14.95	12.95
Spanish	14.95	12.95
ADDICTIVE GAMES		
Football Manager	8.95	7.95
Boffin	9.95	8.95
ADVENTURE INT:		
Gremlins	7.95	6.95
The Hulk	7.95	6.95
Spiderman	7.95	6.95
Adventureland	7.95	6.95
The Count	7.95	6.95
Mystery Funhouse	7.95	6.95
Robin of Sherwood	7.95	6.95
ALLIGATA		
Son of Blagga	7.95	6.95
Contract Bridge	9.95	8.95
Nightworld	7.95	6.95
Fistful of Fun (cas.)	9.95	8.95
Fistful of Fun (disc)	11.95	10.95
ANIROG (Discs 40T add £2)		
Jup Jet	9.95	8.95
ATARISOFT		
Pole Position	9.95	8.95
Robotron	9.95	8.95
BEEBUGSOFT		
Toolkit Plus (ROM)	39.00	35.25
Romit (ROM)	34.00	31.50
Studio Eight (cass)	17.00	15.25
Studio Eight (disc)	22.00	20.00
BUG BYTE		
Twin Kingdom Valley (cas.)		2.95
Tennis (cas.)		2.95
Jack Atac (cas.)		2.95
Savage Pond (cas.)		2.95
C.D.S.		
Birdie Barrage	7.95	6.95
Steve Davis Snooker (cas.)	8.95	7.95
Steve Davis Snooker (disc)	12.95	11.65
COMPUTER CONCEPTS		
Interchart ROM	36.80	33.00
Intersheet ROM	56.35	50.00

	R.R.P.	OUR PRICE
CLARES		
Profile disc)	12.00	11.00
Fontwise (disc)	12.00	11.00
Brom ROM	34.50	31.50
Brom (disc)	27.50	25.00
Replica III (disc)	15.00	13.50
Enhanced Beta Base (disc)	25.00	22.00
Beta Base Utilities (disc)	12.00	10.85
COMSOFT		
Serpents Lair	4.95	3.95
Playbox	4.95	3.95
S.A.S. Commando	4.95	3.95
DR. SOFT (* Disc 40T add £2)		
747 Flight Sim.	7.95	6.95
Phanton Combat*	9.95	8.95
D.A.C.C.		
Flight Sim 747 (DACC)	9.95	8.95
Bobby Charlton Soccer	11.95	10.95
DATABASE (Discs add £3)		
Red Arrows	8.95	7.95
DURELL MARTECH		
Mineshaft	6.95	5.95
Brian Jacks Superstars	7.95	6.95
Combat Lynx	8.95	7.95
Eddie Kidd Jump	7.95	6.95
Gisburne's Castle	7.95	6.95
Geoff Capes	8.95	7.95
ELITE		
Commando (cas.)	9.95	8.95
Commando (disc)	14.95	13.65
EPIC SOFTWARE (Disc versions add £2)		
The Wheel of Fortune cas.	9.95	8.45
Castle Frankenstein cas.	7.95	6.55
The Quest of the Holy Grail cas.	7.95	6.55
Kingdom of Klein cas.	7.95	6.55
GOLEM LTD (For disc version add £2)		
Education I	8.00	7.00
Education II	8.00	7.00
Fun with Words	8.00	7.00
Fun with Numbers	8.00	7.00
Jigsaw	8.00	7.00
HEWSON		
Heathrow A.T.C.	7.95	6.95
Fantasia Diamond	7.95	6.95
Southern Belle	7.95	6.95
ASL/ICON SOFTWARE		
Caveman Capers	7.95	6.95
Contraption	8.95	7.95
Flip	7.95	6.95
Bug Eyes II (cas.)	7.95	6.95
Frankenstein 2000	6.95	5.95
IMAGINE		
Wizardore	7.95	6.95
Yie Ar Kung Fu	9.95	8.95
Kung Fu (disc)	12.95	11.65
Hypersports (disc only)	12.95	11.65
KOSMOS SOFTWARE (Disc version add £1)		
French Mistress A or B*	8.95	7.95
German Master A or B*	8.95	7.95
Spanish Tutor A or B*	8.95	7.95
Answer Back Jun. or Sen.	9.95	8.95
Answer Back Sport	9.95	8.95
Identify Europe	7.95	6.95
L.C.L. (Disc version same price)		
Micro Maths (24 progs 'O' Level)	24.50	21.50
Micro English (24 progs 'O' Level)	24.50	21.50
Mega Maths ('A' Level)	24.50	21.50
Micro French 'O' Level	24.90	21.50

	R.R.P.	OUR PRICE
LONGMAN'S SOFTWARE		
First Moves (Chess 8+)	9.95	8.95
Master Key (Typing Tutor)	9.95	8.95
LEISURE GENIUS (Disc add £2)		
Scrabble	12.95	11.65
Monopoly	12.95	11.65
LEVEL 9		
Price of Magyck	9.95	8.95
Adventure Quest	9.95	8.95
Colossal Adventure	9.95	8.95
Dungeon Adventure	9.95	8.95
Emerald Isle	6.95	5.95
Lords of Time	9.95	8.95
Return to Edan	9.95	8.95
Snowball	9.95	8.95
The Worm of Paradise	9.95	8.95
Red Moon	6.95	5.95
LLAMASOFT		
Colourspace (cas.)	7.95	6.95
MACSEN SOFT		
Treasure Hunt	9.95	8.95
Block Busters	7.95	6.95
Bulls Eye	8.95	7.95
Gold Run	8.95	7.95
MELBOURNE HOUSE		
Classic Adventure	6.95	5.95
Hampstead	6.95	5.95
Terromolinos	6.95	5.95
Hobbit (cas.)	14.95	13.45
Hobbit (disc)	17.95	16.25
Exploding Fist (cas.)	9.95	8.95
Exploding Fist (disc)	14.95	13.45
MICROPOWER (Disc version add £2)		
Dr Who/Terror Mines	18.95	17.25
Castle Quest	12.95	11.65
Ghouls	7.95	6.95
Swag	6.95	5.95
Chess	7.95	6.95
Killer Gorilla	7.95	6.95
U.X.B.	7.95	6.95
Felix in Factory	7.95	6.95
Cybertron	7.95	6.95
Stock Car	6.95	5.95
MIRRORSOFT (Disc version add £3)		
Count with Oliver	7.95	6.95
Look Sharp	7.95	6.95
First Steps	8.95	7.95
Here/There with Mr Men	7.95	6.95
Quick Thinking –	6.95	5.95
Starseeker	9.95	8.95
Harrier Strike Force	9.95	8.95
Word Games	9.95	8.95
M.C. LOTHLORIEN		
Redcats	6.95	5.95
Paras	6.95	5.95
Johnny Reb	6.95	5.95
Special Operations	6.95	5.95
Battlezone	6.95	5.95
Waterloo	9.95	8.95
MICROBYTE		
Er*Bert	4.95	3.95
Reversi	4.95	3.95
Pinball	4.95	3.95
MOSAIC (Disc add £3)		
Erik the Viking	7.95	6.95
Secret Diary of Adrian Mole*	9.95	8.95

	R.R.P.	OUR
OASIS		
Aces High	14.95	12.95
OCEAN		
Match Day	9.95	8.95
QUALSOFT (Disc versions add £3)		
Mexico '86	9.95	8.95
Div. I	9.95	8.95
REDSHIFT		
English Civil War	9.95	8.95
ROBICO SOFTWARE (Disc version add £2)		
Banjax	9.95	8.95
Beeline	7.95	6.95
Enthar 7 (disc)	17.95	16.45
Island of Xaan	9.95	8.95
Rick Hanson	9.95	8.95
SHARDS (* Disc version add £3)		
Mystery of Java Star	7.95	6.95
Whoopsy	6.95	5.95
Woodbury End*	9.95	8.95
SHIELD		
O Level Maths Ex.	9.95	8.95
O Level Chemistry Ex.	9.95	8.95
O Level Physics Ex.	9.95	8.95
SOFTWARE INVASION (* Disc add £3)		
3D Bomb Alley	7.95	6.95
Gunsmoke	7.95	6.95
Blitzkreig*	7.95	6.95
Super Pool	7.95	6.95
Vortex	7.95	6.95
Jet Boat	7.95	6.95
3D Grand Prix*	9.95	8.95
Eagles Wing	7.95	6.95
Stairway to Hell*	12.95	11.65
Chipbuster	7.95	6.95
SOFTWARE PROJECTS		
Manic Miner	7.95	6.95
Lode Runner	9.95	8.95
SQUIRRELSOFT		
Supergolf	**7.50**	**6.50**
Trafalgar	**8.00**	**7.00**
SUPERIOR SOFTWARE (*Disc version add £2)		
Mr Wiz	7.95	6.95
Smash and Grab	7.95	6.95
Overdrive	7.95	6.95
Battletank	7.95	6.95
Wallaby	7.95	6.95
Space Pilot	7.95	6.95
Tempest*	9.95	8.95
Repton*	9.95	8.95
Death Star*	9.95	8.95
Repton 2*	9.95	8.95
Citadel*	9.95	8.95
Speech*	9.95	8.95
Karate Combat (cas.)	8.95	7.95
Karate Combat (disc)	11.95	10.95
TYNESOFT (*Disc versions add £3)		
Ian Botham's Test*	7.95	6.95
Mousetrap*	6.95	5.95
Winter Olympics*	7.95	6.95
Jet Set Willy*	8.95	7.95
U.S. GOLD		
Beach Head	9.95	8.95
Bruce Lee	9.95	8.95
Dambusters (disc	14.95	13.65
Bruce Lee (disc)	14.95	13.65
Tapper	9.95	8.95
Dambusters	9.95	8.95
ULTIMATE		
Atic Atac	7.95	6.95
Alien 8	9.95	8.95
Knightlore	9.95	8.95
Jetpac	7.95	6.95
Sabre Wulf	9.95	8.95
Nightshade	9.95	8.95

21st. Software Ltd. 15 Bridgefield Avenue, Wilmslow, Cheshire SK9 2JS. Tel: (0625) 528885

ALL PRICES ARE INCLUSIVE OF VAT AND CARRIAGE

OVERSEAS ORDERS PLEASE ADD £1.00 THEN 50p FOR 2ND and 3RD ITEMS EACH

We guarantee all titles are originals. We offer a quick and reliable service. Most Electron and BBC titles are available on request with the guarantee of at least £1.00 off the R.R.P.

Please send me: Cas. ☐ Disc ☐ 40T ☐ 80T ☐

1. ____________________ £ __________
2. ____________________ £ __________
3. ____________________ £ __________
4. ____________________ £ __________

TOTAL £ __________

Please make cheques payable to:
21st Software.

Send orders to:

21st SOFTWARE LTD, Dept. MU
15 Bridgefield Avenue,
Wilmslow, Cheshire SK9 2JS
Tel: Wilmslow (0625) 528885

Name ....

Address ....

....

....

Post Code ....

Tel. No. ....

Methodology in our madness

by
The Mad Hatter
10/6

THIS month I want to take a closer look at starting adventures and pass on a few tips about good methodology, as the way you tackle an adventure can make all the difference between success and frustration.

At the risk of stating the obvious, do read the cassette inlay or other documentation carefully before starting. Apart from telling you how to load and run the game, how to save and so on, there is nearly always a general background description – and this can contain useful clues.

Thus, Red Moon made it clear that "Magik" was operative in the game, which automatically made me think of words to say and things to wave or rub. After all, that's how magic usually works.

It also meant that I didn't take things at their face value – not that you ever should where good adventures are concerned – but instead I tried to think how they might have a magical use.

You can also learn from the inlay the type of vocabulary to use. You find out if it is a simple verb-object system where you TAKE SWORD, WAVE TALISMAN, and such like, or whether a more complex and sophisticated parser is in use so that you can enter longer instructions as in Melbourne House's The Hobbit, Level 9's The Worm in Paradise, or something in between like Village of Lost Souls by Magus.

Adventures are sometimes like crossword puzzles so you need a copy of Roget's Thesaurus from time to time to work out alternative ways of saying what you think needs to be done when all that the computer answers is: "Eh?", "Gibberish!" or "I don't understand".

If it's a cassette-based game you can spend the loading time reading the inlay and sometimes you can listen to a piece of music as well.

The best adventures are easy to get into – nothing too demanding in the early stages, but quite often there is an implied invitation to do something right at the start.

With Colossal Adventure the obvious thing is to go into the hut and see what's inside and have a peep down the well. Often you will be given a strong hint where to deposit any treasures collected so as to score maximum points.

Some points are usually awarded for collecting a treasure, but a few are reserved for when you dump it in the right place. Thus, in Village of Lost Souls, points are awarded for putting the necklace on the altar in the church.

I try to remember to have a look at what equipment I have been given to start with. You look at the opening description, and the question is put "What now?", or something similar.

Type in INVENTORY, and you'll be told if you have anything by way of posessions. INVENTORY can usually be shortened to INV – indeed many words can be shortened in this way.

Another useful thing to do at the start is to find out the maximum number of points you can score – type in SCORE and you may be told: "You have 0/1200 points". You may also be given a comment about your status as an adventurer which will be very low at this stage, but expect it to improve as your score points mount up.

Lastly, type in HELP to see whether you get clues in the game. Now you are ready to start.

I generally tackle an adventure in three stages – an initial romp around that's not very serious followed by a careful and systematic mapping exercise that may take several sessions to complete. Finally, I try to solve the puzzles, having got some idea of how to tackle them during the mapping session.

Often you will need to solve puzzles at critical points before you can explore

→

From Page 71

deeper into the adventure – there's a locked door or grating or cave for example.

Usually, as the screen fills up with print it scrolls upwards automatically, but not always. I was baffled in Acheton until I realised the program put the computer into PAGE mode, and that when a screen was filled by a long description all I had to do was to press the Shift key. The documentation hadn't made that clear, and I was afraid my BBC Micro was hanging up on me due to a bug somewhere.

I shall deal with mapping in some detail next time, but now I want to offer some help in reading between the lines of descriptions.

You are always given a list of the available exits from a location – unless it is a maze – but sometimes these are not all of them. There may be an invisible one from time to time which only appears when you have successfully solved a puzzle or when you are carrying the right object.

A clue to this possibility in an adventure may be the phrase: "Visible exits are . . ." I often try all the directions of the compass plus up and down if I suspect a concealed exit, and if the response is: "You can't go that way yet", then I can be sure of a concealed exit in that particular direction.

Next job is to decide how to make the exit appear – if there has been an object somewhere such as a pair of spectacles that's a logical thing to try first, but it may not be the easy.

The other helpful hint you may get from a programmer is along similar lines – you try to do something and get the response: "You can't do that yet!", which again suggests that there's something else to be done first.

Expect clues of this sort from any decent programmer.

Although they want to fox you from time to time, above all else the programmers of adventure games want you to enjoy yourself and buy their next offering.

A passing word in defence of reviewers – we aren't blasé types who have seen it all before and are bored with every offering shown to us. We are ordinary folk who have children, cats, computers, jobs (hopefully, in this day and age) and all we want to do is to spread the news that adventures are the best thing to happen to computers.

This magazine is run by enthusiasts. We want software houses to succeed, we want to see more people buying adventure games, we want to spread the interest among as many people as possible, so here is a prolonged plea for help.

Software houses – send your games (preferably on disc, 40 or 80 track – I've a switchable drive) to the office so that I can review them.

Readers – particularly first time adventurers or those thinking of taking the plunge into their first game – what do you need to know? Send an SAE plus the name of the adventure you are interested in, the location you are at and the problem you face, and we'll try to help you.

I shall be delighted to receive maps of completed games from experienced adventurers and any tips that you would care to pass on. It might even be possible to offer a small prize from time to time.

One bit of disappointing news for me concerns the disc version of The Hobbit. As a Tolkien fan, and having played it on the Spectrum, I had been looking forward to seeing how the pictures looked on the BBC Micro.

Sadly it crashes if your micro is fitted with the DNFS, as mine is, and although I am going to try and borrow a machine with an earlier version of DFS I shan't be able to give a report this month.

I should be pleased to have readers' reactions, though – particularly from any who won it as a prize in *The Micro User* competition. If enough readers contact Melbourne House they might feel it worthwhile to issue an amended version to suit the DNFS.

Help Line

REQUESTS for help are starting to come in. Antony Lowe sent the following example of the ideal letter:

"I would be grateful if you could answer some of my queries about Level 9's Colossal Adventure. Firstly, could you tell me where the pirate's chest is and which maze it's in?

"Also, is there a way to stop the dwarf throwing weapons at you?

"Lastly, is the bear tied to the chain of any significance?"

This letter told me all I needed to know to give precise answers to Antony, not least because I have solved Colossal Adventure.

I expect there are others with similar questions, so here are the answers in a little more detail than I sent to Antony:

Pirate Pete's chest is in the same maze – to get here go to the southern end of the secret N-S canyon where the STALACTITE is and climb DOWN.

The maze is not too difficult – the final move is NE – and if the pirate has stolen something from you there you'll find the chest and any stolen treasures. The chest itself is a treasure.

The dwarves are a nuisance and the only way to avoid them is to keep clear of the central cave area so when the axe is thrown TAKE it, THROW AXE at the dwarf and kill it, then TAKE AXE again.

I have a feeling the dwarves only get bothersome once you've reached a certain score, and are a cunning ploy of Pete Austin's to stop you carrying too many treasures.

I don't want to give too much away here, so answers are in the form of clues. The bear is important, you've got to make friends with him – is he hungry? Separate him from the chain (a treasure) and he will help you scare off a villain.

Here are two cries for help where I can't supply answers as I haven't got the games yet. Alex Plant of Sheffield is having trouble with Hampstead – maps please from anyone who has mastered it.

Alex, can you let us know exactly where your trouble lies so that I can include the right part from a successful map – if we get one?

C. Briancourt of Welling has played Epic's The Wheel of Fortune hundreds of times, but only gained 5 per cent of the possible maximum score. Can someone send me a map – it sounds like a game worth doing.

Finally, I get the impression that adventuring is a pastime shared equally between the sexes, and would be interested to know if there is any great variety in game preferences.

Have you a top ten so far as adventure games are concerned – what are your favourite features and pet hates? Let us know.

Happy adventuring.

GO BANANAS

Suitable for virtually ALL computers with 5¼" drives whether single or double sided. If a single sided drive, then you will be able to get twice the storage as you can flip these over.

banana
banana
10
REVERSIBLE
MINIDISKS
banana
banana
banana

Only £8.65 exc VAT

(£9.95 inc VAT per ten-pack)

Specification:-

These bananas are reversible & double sided double density. This means that you can get TWICE the storage space with single sided drives, as these disks can be flipped over. They are of course perfectly suitable for double sided disk drives, and single density applications.

Grown exclusively by:-
DISKING
FREEPOST
Liphook
Hants. GU30 7BR
Tel: (0428) 722563 (24hr Order hotline)

POST to:- DISKING
FREEPOST Liphook Hants GU30 7BR
Tel: (0428 722563)
Please rush me ____ boxes of bananas @ £9.95 per box (plus P & P at 50p a box) inc VAT
Ten boxes or more – POST FREE
Official Government orders welcome
I claim my FREE 'Go Bananas' badge with every ten-pack
All Orders despatched in 4 hours

Name ____________________

Address ____________________

____________ tel no: ____________

I enclose cheque payable to DISKING or please debit my Access/VISA card No:-

If coupon clipped – JUST CALL

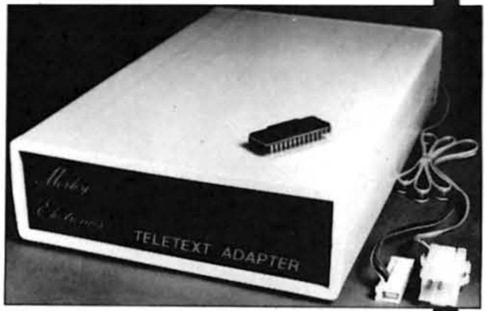
MORLEY ELECTRONICS

The Morley Teletext adapter introduces you to the world of Teletext at a price that wont break the bank. Inside it you will find the latest in second generation Teletext chip technology, which unlike our rivals who are still using chips designed more than eight years ago, will be fully compatible with any future advances in the Teletext system.
With the Morley adapter you will get a unit that automatically tunes itself in to the required station (no more messing around with screwdrivers in the back of the case), a user friendly menu driven program, easy to follow instructions and a 12 month warranty. Add to this the free downloadable telesoftware and we are sure that you will agree that we are offering you one of the best bargains on the market today.

For technical details please ring Morley Electronics on Tyneside (091) 251 3883.

FEATURES

- Advanced design uses the latest technology will handle ANY future enhancements to the Teletext system eg: full field: 8 bit data transfer: 2k pages etc.
- Simply plugs into the Plus 1 interface.
- Low power consumption, less than 200ma. Optional power supply available.
- User friendly menu driven software including extended OSCLI and Osword commands for access from BASIC programs.
- No user-RAM required (PAGE remains at default value).
- FREE Telesoftware, no access charges. (at present updated weekly.)
- Save selected pages to disc/tape for later retrieval.
- Full access to all Teletext services and channels eg: CEEFAX, ORACLE, 4-TEL.
- Gives you a real-time clock at your disposal (*TIME).
- Free software upgrades to allow for any enhancements to the teletext service. Eg: extra channels, full field data on cable & satellite systems etc.
- Easy to follow comprehensive user guide.
- No hardware limitations, it can for example receive virtually unlimited numbers of channels.
- Works with Solidisc SWR.



- Utils disc available including printer drivers allows pages to be selected and dumped direct to a printer (no more TV or Radio Times to buy).

ELECTRON TELETEXT ADAPTER
Electron adapter now available, including emulated Mode 7 allowing you to run long Adventure type programs. Please ring for details.

Now available the first true MEGA capacity RAMdisc for the BBC or MASTER computers.
This fully compatible unit, currently available in either 1 or 2 megabyte versions comes complete with operating software on ROM, power supply, battery backup and a comprehensive user guide, add to this our usual 12 months no quibble guarantee and we're sure you'll agree Morley have done it again.

FEATURES
1 Megabyte of RAM connected to the 1 MHz bus.
Used with the supplied ROM software programs and files may be saved and loaded from the RAMdisc in the same manner as from a floppy disc with a large increase in speed, for example, a 20K mode 0 screen takes about 3-4 seconds to load from disc and about 0.2-0.3 seconds to load from the RAMdisc.
The RAMdisc ROM operates as a utility ROM working with the current filing system rather than as a separate filing system. Therefore ensures compatibility with any DFS.
The RAMdisc can be selected by a * command to take the place of any drive number from 0 to 9. If the RAMdisc replaces a floppy drive as 0 for example, all commands addressed to drive 0 will be intercepted by the RAMdisc. The default drive no. is 4.
'Dangerous' * commands such as *COMPACT, *COPY, *BACKUP etc are intercepted and the BBC's RAM from page 2 to &7FFF is saved to RAMdisc workspace, and may be recovered using a * command. This prevents accidental corruption of any programs/data in RAM you may have been using at the time. The save operation delays the * command by just under 0.4 seconds. The BBC's RAM can also be saved by an interrupt-driven routine which can be enabled by a * command.
The 'filing system wedge' ROM supplied supports load/save, byte file access, all relevant OSFSC commands, and contains a formatter, verifier and 'sector' editor for use with the RAMdisc.
Catalogue structure allows up to 2,709 files.

APPLICATIONS
Programs and ROMs can be written to take advantage of directly accessing a single RAMdisc, allowing the possibility of spreadsheets with more than 512 × 512 cells, million-character documents with immediate access and editing of any section, manipulation of 2 floating-point arrays each with 228 × 228 elements, a fast-access database with 10,000 100-character records, or even just a large printer buffer!
Accessible through the user's software for direct storage of eg: basic procedures, variables, large arrays etc which can be downloaded into the BBC's RAM or read directly. (We are hoping to be able to supply an extended basic ROM late this year, to allow 'transparent access' to the Ramdisc, which will effectively expand the BBC's RAM to about 1020k.)

OPTIONAL SIDEWAYS RAM UTILITY (suitable for use with any 16k SWR)
Sideways ROM images can be saved to the RAMdisc under a special directory which, when enabled, will be used when an unrecognised * command is trapped for the ROM to load sideways ROMs from disc into sideways RAM. The * command will then be passed to the new ROM image and if still unrecognised the next ROM will be loaded. If no ROM loaded from the RAMdisc intercepts the * command it will be passed to the current filing system as usual. ROMs on RAMdisc can be individually disabled in the same manner as 'real' ROMs in the BBC itself. Up to 104 8k ROMs can be saved onto the standard 1Mb RAMdisc, and the total load time (excluding time taken by the ROMs to process the command) for 100 ROMs is just under 9 seconds. All relevant control software for disabling/enabling ROMs etc. is provided. (Supplied on ROM.)

Morley Electronics
RAM DISC

EPROM PROGRAMMER now available programs 8, 16 and 32k EPROMS connects to the user port software available on rom or disc.
Version 1 economy uncased with standard DIL socket.
Version 2 deluxe cased with ZIF socket.

DESFAX 7 – Now you can run your own TELETEXT service!
Incorporates the powerful editing facilities of DESIGN 7, again with Teletext adapter interfacing.
Stores up to 100 of your screen designs on a 40Tk disc or 200 on an 80Tk. Page selection by 3-digit number HOLD, REVEAL, page linking, individual page delays etc.
PLUS – a powerful CAROUSEL facility permits continuous slide-shows. Only one disc access for every 16 screens – reduces wear on drives. Smooth animation, variable speed text printing, built in printer dumps. Sample data disc and 22 page manual included. Beats all other systems for ease of use and versatility.

M/B software DESIGN 7
Easily the best value Mode 7 screen designer on the market today. Design any mode 7 screen, from simple MENU pages to full CEEFAX standard. This program is an invaluable aid. Designs can be saved to disc as automatically numbered files or the program will convert the screen into a Basic Proc.
INTERFACES DIRECTLY WITH ADAPTER allowing CEEFAX-ORACLE pages to be selected and dropped into editor screen for alteration, saving, or conversion to BASIC. Allows channel change from within program.

To order please fill in and send order form to: **MORLEY ELECTRONICS, Unit 3, Maurice Road Industrial Estate, Wallsend, Tyne and Wear NE28 6BY.**

NOW AT NEW PREMISES

Please send me.

Qty. ☐ Morley Teletext adapters	@ £74.45 inc. VAT & P&P.	Qty. ☐ 1 Mbyte RAM disc	@ £199.95 inc. VAT & P&P.
Qty. ☐ Teletext software on Rom	@ £24.95 inc. VAT & P&P.	Qty. ☐ 2 Mbyte RAMdisc	@ £349.95 inc. VAT & P&P.
Qty. ☐ Teletext software on Disc	@ £23.95 inc. VAT & P&P.	Qty. ☐ Utils ROM	@ £18.95 inc. VAT & P&P.
Qty. ☐ M/B DESIGN7 screen designer	@ £8.95 inc. VAT & P&P.	Qty. ☐ Eprom Programmer V.1	@ £18.95 inc. VAT & P&P.
Qty. ☐ Teletext utilities on Disc	@ £5.95 inc. VAT & P&P.	Qty. ☐ Eprom Programmer V.2	@ £27.95 inc. VAT & P&P.
Qty. ☐ Optional PSU	@ £9.95 inc VAT & P&P.	Qty. ☐ Desfax	@ £24.00 inc. VAT & P&P.

Please delete 40/80

NB. ROM or Sideways RAM software must be purchased with Teletext Adapters.

Total £

NAME ______ PHONE No. ______ CHEQUE No. ______

ADDRESS ______

______ POSTCODE ______

Please allow 28 days for delivery.

MicroLink
Your personal passport to the world of communications with
TELECOM GOLD
Telecom Gold is a trademark of British Telecommunications plc

What it offers the BBC Micro user . . .

Electronic mail is much cheaper than the post

Sending mailbox messages to other subscribers, whose numbers are rapidly growing, is the cheapest form of communication possible. You can send a message of any length to another mailbox for less than the cost of a first-class stamp. And it doesn't cost a penny more to send the same message to 500 different mailboxes! Even a message sent to a mailbox on the other side of the world only costs 30p.

The biggest bulletin board of them all

The number of bulletin boards is growing rapidly. The only snag is that the vast majority are single-user boards – which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

Give your micro mainframe power

With MicroLink your micro becomes a terminal linked directly to the Telecom Gold mainframe computer, and able to tap its tremendous power and versatility. Right away you'll be able to use giant number-crunching programs that can only run on a mainframe.

The mailbox that is always open

MicroLink is in operation 24 hours a day, every day. That means you can access your mailbox whenever you want, and from wherever you are . . . home, office, airport – even a hotel bedroom or golf club! No-one needs to know where you are when you send your message.

We're only a local phone call away

The majority of MicroLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom's PSS system, which has access points all over Britain. A local phone call is all you need, too, for direct access via MicroLink to all the other countries belonging to the international Dialcom system.

Telemessages – at a third off

The modern equivalent of the telegram is the telemessage. Send it before 10pm and delivery is guaranteed by first post the following day (except Sunday). The service was intended for people phoning their message to the operator, which costs £3.50 for 50 words. But you can now use it via MicroLink, for only £1.25 for up to 350 words! For an extra 65p your message can be delivered in an attractive greetings card.

Go teleshopping on your micro

With MicroLink you can study the British Rail timetable – and then buy your ticket in advance. You can book theatre tickets. And even order a bouquet of flowers. It's all part of the teleshopping revolution!

Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 1½ million worldwide – and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or when travelling.

What does it all cost?

Considering all the services you have on tap, MicroLink is remarkably inexpensive. You pay a once-only registration fee of £5, and then a standing charge of just £3 a month. On-line costs are 3.5p a minute (between 7pm and 8am) or 11p a minute during office hours. There is an additional 2.5p a minute PSS charge if you are calling from outside the 01- London call area. Charges for telex, telemessages and storage of files are given on the next page.

How much it costs to use MicroLink

Initial registration fee: £5.

Standing charge: £3 per calendar month or part.

Connect charge: 3.5p per minute or part – cheap rate; 11p per minute or part – standard rate.
Applicable for duration of connection to the Service. Minimum charge: 1 minute.
Cheap rate is from 7pm to 8am, Monday to Friday, all day Saturday and Sunday and public holidays; Standard rate is from 8am to 7pm, Monday to Friday, excluding public holidays.

Filing charge: 20p per unit of 2,048 characters per month.
Applicable for storage of information, such as telex, short codes and mail files. The number of units used is an average calculated by reference to a daily sample.

Information Databases: Various charges.
Any charges that may be applicable are shown to you before you obtain access to the database.

MicroLink PSS service: 2.5p per minute or part (300 baud); 3p per minute or part (1200/75 baud).
Only applies to users outside the 01-London call area.

Telex registration: £10.

Outgoing telex: 5.5p per 100 characters (UK); 11p per 100 (Europe); 18p per 100 (N. America); £1.25 per 400 (Rest of world); £2.75 per 400 (Ships at sea).
Deferred messages sent on the night service are subject to a 10 per cent discount.

Incoming telex: 50p for each correctly addressed telex delivered to your mailbox. Obtaining a mailbox reference from the sender incurs a further charge of 50p.
It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide a mailbox address.
Each user validated for telex and using the facility will incur a charge of 6 storage units a month. Further storage charges could be incurred depending on the amount of telex storage and the use made of short code and message file facilities.

Telemessages: £1.25 for up to 350 words.
Telemessages can be sent with an illustrated greetings card for 65p extra.

Radiopaging: No charge.
If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.

International Mail: For the first 2,048 characters – 20p to Germany and Denmark; 30p to USA, Australia, Canada, Singapore, Hong Kong and Israel. For additional 1,024 characters – 10p; 15p.
These charges relate to the transmission of information by the Dialcom service to other Dialcom services outside the UK and the Isle of Man. Multiple copies to addresses on the same system host incur only one transmission charge.

Billing and Payment: All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

Software over the telephone

MicroLink is setting up a central store of software programs which you'll be able to download directly into your micro. The range will include games, utilities, educational and business programs, and will cover all the most popular makes of micros.

Talk to the world – by satellite

MicroLink is part of the international Dialcom network. In the USA, Australia and a growing number of other countries there are many thousands of users with electronic mailboxes just like yours. You can contact them just as easily as you do users in Britain – the only difference is that the messages from your keyboard go speeding around the world via satellite.

What you need to access MicroLink

You must have three things in order to use MicroLink: a computer (it can be any make of micro, hand-held device or even an electronic typewriter provided it has communications facilities), a modem (it can be a simple Prestel type using 1200/75 baud, or a more sophisticated one operating at 300/300 or 1200/1200 baud), and appropriate communications software.

MicroLink

in association with

TELECOM GOLD *

Application Form

I/We hereby apply to join MicroLink

(✓) ☐ I enclose my cheque for £5 payable to Database Publications as registration fee to MicroLink.

(✓) ☐ I also wish to use Telex. I authorise you to charge an additional £10 to my initial bill for validation.

☐ I confirm that I am over 18 years of age.

☑ I confirm that I accept the terms and conditions for the time being in force, a copy of which are available on request.

I intend to use the following computer ____________

Signature ____________

Date ____________

FOR OFFICE USE ONLY:

Mailbox assigned ____________

Start date ____________

Password ____________

MU 7

SEND TO:
MicroLink
Database Publications
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

Name ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Position ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Company ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Address ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Postcode ☐☐☐☐☐☐☐☐ Daytime telephone ☐☐☐☐☐☐☐☐☐☐

Commencement of Service
Please indicate month of commencement ☐☐ 19 ☐☐
Allow 10 days for validation of mailbox

Payment
Whilst Database Publications Ltd is the supplier of all the services to you, the commission and billing thereof will be handled by Telecom Gold as agents for Database Publications Ltd.
Date of first payment to be on 15th of month following commencement.
Please complete billing authorisation form A, B or C below:

A. Direct Debiting Mandate *(Enter full postal address of Bank Branch)*

To ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

I/We authorise you until further notice in writing to charge to my/our account with you on or immediately after 15th day of each month unspecified amounts which may be debited thereto at the instance of British Telecommunications plc – TELECOM GOLD by Direct Debit. Bills are issued 10 days before debit is processed.

Name of Account to be debited ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Account Number ☐☐☐☐☐☐☐☐

B. Please debit my/our Access/Visa/*American Express account number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
** Overseas subscribers only*

I/We authorise you until further notice in writing to charge to my/our account with you on or immediately after 15th day of each month unspecified amounts which may be debited thereto at the instance of British Telecommunications plc – TELECOM GOLD. Bills are issued 10 days before charge is applied to your account.

Signature ____________ Date ____________

C. Please invoice the company/authority.

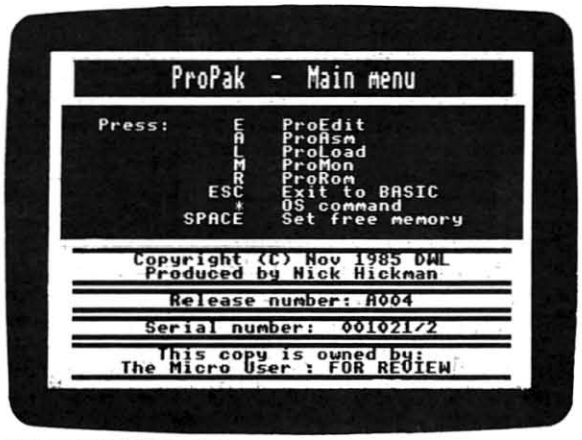
(✓) ☐ If you select this option, which is ONLY AVAILABLE to government establishments and Public Limited Companies, you will be sent an authorisation form for completion which will require an official order number to accept unspecified amounts.

* *Telecom Gold is a trademark of British Telecommunications plc.*

Welcome back, old integrated friend..

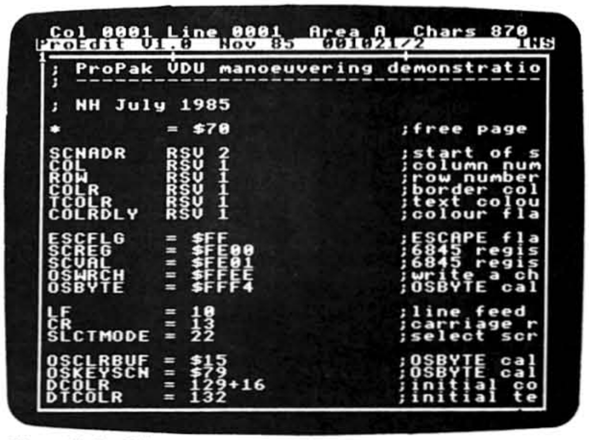
By JIM NOTMAN

Product: ProPak
Price: £6.95
Supplier: Dataview Wordscraft, Radix House, East Street, Colchester CO1 2XB
Tel: 0332 371428



```
ProPak  -  Main menu

Press:       E   ProEdit
             A   ProAsm
             L   ProLoad
             M   ProMon
             R   ProRom
           ESC   Exit to BASIC
             *   OS command
         SPACE   Set free memory

      Copyright (C) Nov 1985 DWL
      Produced by Nick Hickman

      Release number: A004

      Serial number:  001021/2

        This copy is owned by:
     The Micro User : FOR REVIEW
```

Figure I: ProPak main menu



```
Col 0001 Line 0001  Area A  Chars 870
ProEdit V1.0  Nov 85  001021/2         INS
; ProPak VDU manoeuvering demonstratio
; ----------------------------------------

; NH July 1985

*          = $70                   ;free page

SCNADR     RSV 2                   ;start of s
COL        RSV 1                   ;column num
ROW        RSV 1                   ;row number
COLR       RSV 1                   ;border col
TCOLR      RSV 1                   ;text colou
COLRDLY    RSV 1                   ;colour fla

ESCFLG     = $FF                   ;ESCAPE fla
SCREG      = $FE00                 ;6845 regis
SCVAL      = $FE01                 ;6845 regis
OSWRCH     = $FFEE                 ;write a ch
OSBYTE     = $FFF4                 ;OSBYTE cal

LF         = 10                    ;line feed
CR         = 13                    ;carriage r
SLCTMODE   = 22                    ;select scr

OSCLRBUF   = $15                   ;OSBYTE cal
OSKEYSCN   = $79                   ;OSBYTE cal
DCOLR      = 129+16                ;initial co
DTCOLR     = 132                   ;initial te
```

Figure II: ProEdit

WHEN I first saw the name of the software company on the package it was rather like meeting a friend of old.

Dataview Wordcraft may not be known for writing software in BBC Micro circles, but I remembered one of their earlier products, Wordcraft, a superior word processing program for Commodore computers that dates back to the bad old days before there was a BBC Micro.

Their current offering, ProPak, is a comprehensive assembly language development package which is supplied on disc. It costs £69.95, and consists of five main programs: ProEdit, a full screen text editor; ProAsm, the 6502 assembler; ProLoad, an Object code module loader; ProMon, a machine code monitor and debugger; and ProRom, which is eprom programming software.

Each module is designed to be loaded from disc and run from RAM. In addition there are extra versions of three of the modules – ProEdit, ProAsm and ProMon – also on the disc. These can be burnt on to eproms, so that they will run just like a ROM.

An eprom programmer is available for another £69.95 to complete the package and make full use of the ProRom software.

I remembered from Wordcraft that the company is very conscious of software piracy and every package has a unique serial number displayed on the screen. The main protection against software theft is provided by a dongle, a small hardware device plugged into the computer in order for the software to work.

On the BBC Micro this dongle is a small plastic box which plugs into the analog port. It doesn't normally interfere with other software. The only problem that may arise is that other hardware, for example joysticks, may need to be plugged into the port instead.

Most of the programs use the function keys to enter commands. Keystrips, detailing the commands, are supplied neatly spiral-bound together.

The easiest way to start using this package is from the menu, obtained by pressing Shift+Break, as seen in Figure I. Any module can then be selected by pressing one key. An important option, Set free memory, permits PAGE to be lowered to make more memory available to the software.

Each module can still be called directly without the menu, for example *PROEDIT.

Figure II shows that when ProEdit is initialised it turns the screen display to Mode 4. The top line displays the current position of the cursor, the current text area and the amount of memory still free for text.

The second line is where messages and commands are entered and at the end of that line there is an indication of whether text is to be inserted (INS) or will overwrite any text (OVR) at the cursor position.

The area for display of text has a border drawn around it like a window. The text area is usually much larger than the window, but the cursor can be moved anywhere within the text by moving the window around with the cursor keys.

Copying, deleting and inserting blocks of text is done by a cut and paste technique. For example, to move text from one position to another place the cursor at the start of the block to be moved and press the Block remove key.

Then move the cursor to the end of

→

From Page 77

the block. As it moves, the relevant text is highlighted by having the colours inverted. The spacebar is then pressed to show the end of the block and all of it is then cut from the screen and put in a temporary buffer.

The cursor can now be moved to where the block of text is to be placed and the block insert key pressed, copying the buffer back into the main text area. This sounds complicated, but soon becomes second nature.

The memory is divided into a maximum of 26 different text areas, and text can be transferred from one area into another.

Up to nine screen windows can be defined to keep track of the various text areas, as in Figure III. The number of each window is displayed in its top left corner.

With PAGE at the normal DFS value of &1900 there is only space for 2527 characters with the disc version, increasing to 13535 characters with the ROM version. The 40 column mode is usually satisfactory for assembler code.

An 80 column screen mode is only possible with the ROM version, but is not very practical with only 735 bytes free with PAGE at &1900. For more room it will be necessary to lower PAGE to &1500 or &1200 from the initial ProPak menu.

It is disappointing that it will not work with the 6502 second processor or even with shadow RAM on the B+ or extra shadow RAM boards because this impressive text editor is limited by a shortage of memory. Who wouldn't love to use this with an 80 column mode and all those windows?

In common with most other assemblers each line consists of up to four fields – with a label, mnemonic, operand and comment.

The Mostek-type mnemonics used are similar to those used in the built-in assembler in BBC Basic. Acorn are unusual in using an & to precede a hexadecimal number. It is more usual to have a $ and this assembler will accept both.

Only the standard 6502 instructions are allowed. None of the extensions which take advantage of the extra instructions and addressing modes of the 65C02 in the second processor, and 65C12 for the new BBC Master are supported.

There is an extensive list of assembler directives available from ORG to specify the code origin, to INPUT which allows keyboard inputs during assembly.

Assembly takes place in two passes and is fast if the assembled code and reference tables will fit into memory. If not, assembly must be from disc, which greatly limits the speed of access.

Different assembler sections can be chained together during assembly. The listing of the assembly, including a table with the values of all the labels, can be directed to screen, printer or disc.

There is detailed reporting of any errors encountered. Two types of output file can be produced, one that is in a form that can be *RUN and one which produces object file modules for ProLoad.

ProLoad is a linking program which can combine separate program modules, producing a memory usage table as it does so.

More complex manipulations are possible. For example code may be executed at load time to permit scrambling of the code, to prevent software piracy.

When called, ProRom enters a front panel as shown in Figure IV. The upper screen shows the contents of the various registers, status flags, part of the stack and disassembles the instruction found at the program counter.

Full memory editing is allowed in either a hexadecimal and Ascii display or a disassembly. The disassembly precedes hex values with a $ and does not use labels such as OSBYTE, only giving addresses such as &FFF4.

It is very colourful, but can be difficult to read if you've only got a monochrome TV, with red on a black background.

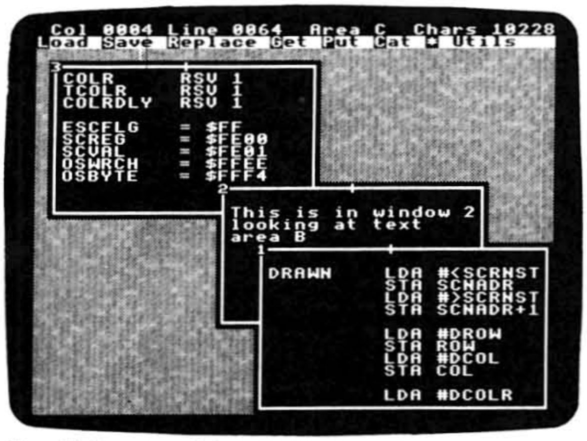
For debugging, there is an ability to single step through both ROM and RAM, and a comprehensive breakpoint system. Up to nine breakpoints may be set at any time. They can be set to interrupt the program when there is any change to a register or a code between a specific area is executed, when writing to or reading from any range of memory locations, when the contents of the accumulator, X or Y registers has a particular value and on execution of any specified op values.

To fully use ProRom you need the optional eprom programmer which will read and write to 2k, 4k, 8k and 16k eproms. Commands include a blank eprom check, a hexadecimal dump and a disassembler.

You'll be spoilt for choice with four different programming methods, from the slow normal to a very fast test which is able to program a 16k eprom in about 30 seconds.

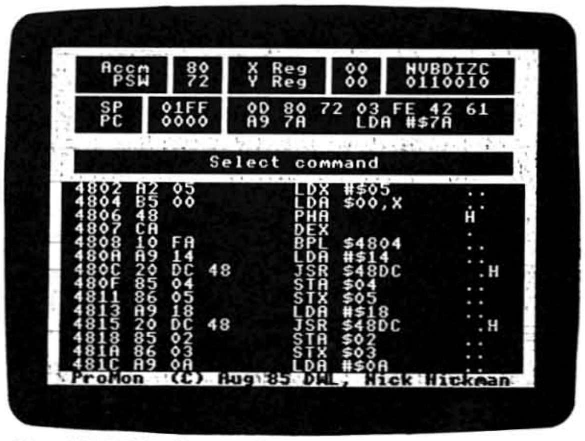
To complete the extensive software there are more than 190 pages of A5 spiral bound documentation.

Verdict: Apart from the limitations mentioned this is a striking piece of integrated software.



```
Col 0004 Line 0064  Area C  Chars 10228
Load Save Replace Get Put Cat * Utils

3
COLR        RSV 1
TCOLR       RSV 1
COLRDLY     RSV 1

ESCFLG      = $FF
SCREG       = $FE00
SCVAL       = $FE01
OSWRCH      = $FFEE
OSBYTE      = $FFF4

2
This is in window 2
looking at text
area B

1
DRAWN       LDA #<SCRNST
            STA SCNADR
            LDA #>SCRNST
            STA SCNADR+1

            LDA #DROW
            STA ROW
            LDA #DCOL
            STA COL

            LDA #DCOLR
```

Figure III: Text screen windows



```
Accm  80   X Reg  00   NVBDIZC
 PSW  72   Y Reg  00   0110010

SP   01FF   0D 80 72 03 FE 42 61
PC   0000   A9 7A       LDA #$7A

            Select command

4802 A2 05           LDX #$05      ..
4804 B5 00           LDA $00,X     ..
4806 48              PHA           H
4807 CA              DEX           .
4808 10 FA           BPL $4804     ..
480A A9 14           LDA #$14      ..
480C 20 DC 48        JSR $48DC     .H
480F 85 04           STA $04       ..
4811 86 05           STX $05       ..
4813 A9 18           LDA #$18      ..
4815 20 DC 48        JSR $48DC     .H
4818 85 02           STA $02       ..
481A 86 03           STX $03       ..
481C A9 0A           LDA #$0A      ..
ProMon  (C) Aug 85 DWL, Nick Hickman
```

Figure IV: ProMon front panel

OPUS WILL MAKE YOU A BETTER ORGANISER FOR ONLY £60

If your micro system is starting to get out of hand a smart organiser could be the solution to your problems.

At just £59.95 the Organiser desk from Opus Supplies will help to organise your system beautifully. It's purpose built to provide plenty of storage space and because it's produced alongside our range of executive computer desking it offers a level of quality you'll appreciate.

Shelving accommodates your monitor, printer computer, disc drive or cassette recorder and software, and the teak-finished unit is fitted with castors to make it fully mobile. The Organiser's assembled dimensions are: H. 31″, W. 40¼″ and D. 26″.

And our price includes VAT and FREE DELIVERY.

The Organiser desk is suitable for use with all leading home micros including the BBC, Amstrad, Commodore and Sinclair computers.

Getting organised couldn't be easier. Phone us on 0737 65080 or simply post the coupon below.

To: Opus Supplies Ltd,
55 Ormside Way, Holmethorpe Industrial Estate, Redhill, Surrey.

Please rush me the following:
(PRICES INCLUDE VAT AND CARRIAGE)

________ Organiser Desk(s) at £59.95 each (inc. VAT)

I enclose a cheque for £________ or please debit my credit card account with the amount of £________

My Access ☐ Barclaycard ☐ (please tick) no. is: ________

Name ________

Address ________

Telephone ________

BBC

Opus.
Opus Supplies Ltd.

BRING Twillstar INTO YOUR HOME

ALL PRICES INCLUDE VAT

Computers

MASTER 128

Complete With Internal Software	£454.25
Master Turbo Upgrade	£113.95
Master Econet Module	£46.00
Master ET	£373.75
Master 512 Upgrade	T.B.A.
Master SC Upgrade	T.B.A.
Eprom Cartridge	£14.95
Reference Manual Part I	£14.95
Reference Manual Part 2	£14.95
6502 Second Processor	£179.00
Z80 Second Processor	£379.00
Acorn Prestel Adaptor	£125.00
Acorn Teletext Receiver	£135.00
Winchester Disk Drive 10 MBYTES	£1250.00
Winchester Disk Drive 30 MBYTES	£1850.00
IEEE Interface	£299.00
Music 500	£178.00

ECONET ACCESSORIES

100in Cable	£89.00
Station Lead Set	£29.00
Econet Starter Kit	£99.00
Econet Bridge	£199.00
Level I Fileserver 40 Track	£99.00
Level 2 Filesaver 80 Track	£235.00
Printer Server Eprom	£49.00

Disc Drives

MITSUBISHI DISC DRIVES

User Friendly Disk Drives
100% BBC compatible slimline disc drives. All drives are supplied complete with formatting diskette, comprehensive users manual and all necessary cables.
All drives are 40/80 Track switchable at the front and have two years warranty.

5¼" Drives without P.S.U.

MD 400A Single 400K Double Sided	£118.00
MD 802C Dual 400K Double Sided	£215.00

5¼" Drives with P.S.U.

MD 400B Single 400K Double Sided	£135.00
MD 802E Dual 400K Double Sided	£240.00

SPECIAL

MD 802D Dual 400K Drives horizontally mounted in a monitor stand to fit both the BBC B and the Master series. £265.00

MD802D
2 Year Warranty

We are unable to list all the products that we stock—Please call for further details or visit our NEW SHOWROOM

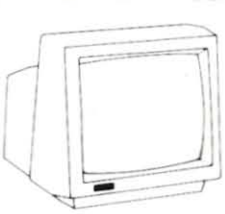
BBC Upgrades

64K Upgrade Kit	£39.95
17/70 Upgrade Kit	£49.94
ADFS ROM	£29.95
Disc Upgrade Kit	£89.00
Econet Upgrade Kit	£49.00
Speech Upgrade Kit	£49.00
DNFS ROM	£20.00

Monitors

MONOCHROME MONITORS

Phillips BM 7502 Green Screen	£79.00
Phillips BM 7522 Amber Screen	£95.00
Kaga KX 1202G Hi Res Green	£120.00
Kaga KX 1203G Ultra Hi Res Amber	£120.00



Hantarex H x 12 Dark Gloss Screen high resolution monochrome monitor 12" Composite Video & Audio input £89.00

COLOUR MONITORS

Microvitec 1431 Std Res	£201.25
Microvitec 1451 Med Res	£270.25
Microvitec 1441 Hi Res	£391.00
Microvitec 2030 Cs 20 Std Res	£425.50
Microvitec 1431 AP Std Res	£224.25
Microvitec 1451 AP Med Res	£293.25

Phillips CM 8501 STD Res Monitor with grey glass Screen RGB and Audio input £209.00

Phillips CM 8533 Med Res monitor with dark glass etched screen composite video input RGB and Audio Input. £289.00

OUTSTANDING PERFORMANCE
OUTSTANDING VALUE
Just released by Hantarex 14" Colour Monitor Std Resolution RGBI PAL Audio Input (Inc. VAT) £189.00

SPECIAL OFFER

Mitsubushi 1404 Medium Resolution Monitor with 640 X 200 Pixels RGB available with IBM or BBC Leads. £229.00

Taxan Super Vision *III*
This display is designed for business use which provides both high-res monochrome (Green, Amber, and White reverse) mode and high-res Colour graphic mode all in one. £369.00

TV MONITORS

Phillips 1114 colour TV/monitor with 14" tube offedring 10 Preselect channels RF CVBS and RGB inputs £199.00

TCL Special Package

The TCL All in One Word Processing Package contains a Master 128, View 3.0, Viewsheet, High Res Green Monitor, 800K Dual Drives with PSU, Quendata Daisy Wheel Printer together with a box of Discs, Paper, and all the Cables. £914.25

Modems

NIGHTINGALE MODEM

APPROVED

Including Commstar and Comprehensive Manual	£130.00
Auto Dial/Auto Answer Board	£55.00
Auto Dial Utilities Disc	£11.00
OBBS Bulletin Software	£23.00

DEMON MODEM

PROHIBITED

With its Devilishly Clever features Auto Dial, Auto Redial, Auto Answer Full and Half Duplex European and USA Standards Complete with Power Supply Leads and Manuals Full Baud Rates

Demon with BBC ROM	£81.00
Dial Disc	£4.95

MAGIC MODEM

PROHIBITED

with 300/300 Full Duplex, Auto Dialing RS232 & 5 LED's (Transmit Data-Receive Data) Carrier, Power & Data Direction £81.00

Printer Buffer

Now available
Taxan Multipurpose Type Printer Buffer KIF-4308 compatible with any Centronics interface printer £149.00

MODE EXPOSITION

1. Manual Mode
In the manual mode, data which has been received is sent to a selected printer and directly printed out. Copy is also available by pressing the COPY key.

2. Double Mode
In the double mode the same data which has been received is sent to two printers simultaneously and printed out. Copy print is also available by pressing the COPY key.

3. Free Mode
In the free mode the command VT and FF code are read as a data fill end code. Of the two printers the data is automatically sent to whichever unit is free for service first. This means that the print time of a amount of data is minimized by using two printers without regard to the data list size.
NOTE: This means that if you try to print two reports at the same time, on two printers, the printers may intermix pages.

4. Command Mode
In the command mode the operation is similar to the manual mode. Data sent is not determined by the SELECT key, but by a certain command the required printer is selected and the number of copies is assigned. This command is internally processed as a control code and is not output.

5. Clear Key Mode
The clear key mode is furnished for cleaning an error occuring during the printing and data input. The function is to stop the printer currently under operation and erase the copy count. However, only the last data input remains and can be reprinted by pressing the COPY key.

FEATURES
1. A printer currently under operation is indicated by an LED, and therefore is immediately known.
2. The copy capacity is available up to 255 sheets. The number of copies expressed in a binary mode by LED (up to 15).
3. The Buffer is furnished A 64K RAM as standard, optionally expandable in increments of 64K, up to 256K and can be connected to most printers and CPU's.

Printers

DOT MATRIX PRINTERS

SPECIAL OFFER
Juki 5510 - Gives you 180 CPS & NLQ Standards
£179.00 Inc. VAT

...and thats not all! The Juki 5510 also has full graphics mode, two position 'dip-switch' (providing instant compatibility with both the Epson and the IBM Graphic Printer). Standard 2K memory (expandable to 14K) built-in Parallel Centronics interface and 8-switch international character sets.
If you need colour too, the optional Juki 5510 Colour Kit gives you seven colours. £112.00

CITIZEN 120 D

This new citizen 120D with 120 CPS and 25 CPS NLQ comes with tractor and friction feed as standard. IBM and Epson Compatible with TWO years Warranty £159.00

CITIZEN MSPIO

The new citizen MSPIO with 160 CPS Draft and 40 CPS NLQ. With TWO years Warranty £269.00

NEW

STAR NL-10

Fine Near-Letter-Quality, 100% compatibility and total reliability all in one easy to use printer. For quality, ease of operation and dependability, nothing beats the Star NL-10. You get outstanding print quality at 120 cps in draft mode and 30 cps in near letter quality. Plus, the sleek NL-10 offers full compatibility with most popular computers through plug in interface cartridges. Just insert the appropriate plug in interface cartridge for your IBM-PC, Commodore, Apple IIc or other parallel computer and your Star NL-10 is ready to print. Touch a button on the control panel to set the print pitch (3 choices), to select the typeface and to print in either draft or NLQ mode. You can even set left and right margins, make top of form settings and control forward and reverse feed in the smallest pitch. £229.00

BROTHER M1109 NLQ

Printer 100cps Directectional Logic Seeking Friction feed and secondery optional tractor feed £189.00

Printers

KAGA KP 810PC

160 CPS IBM compatible graphics matrix printer.New features include: Faster 160 CPS draft printing speed. Front panel selection of print modes. Double height printing mode (in draft & NLQ). Superscript & Subscript in NLQ. NLQ Double strike. Sample swithcing between NLQ & *Condensed Italic.* User defined letterheads. Front panel selection of NLQ typeface with optional XT 10 sound. Full IBM screen graphic character set in draft or NLQ print modes. IBM®/EPSON® compatible high resolution (bit image) graphics. Improved dot alignment and faster printing of graphic characters **£249.00**

EPSON LX80

With 100 CPS draft and 16 CPS NLQ and optional tractor adaptor and sheet feeder. This printer has a standard parallel connection and accepts all other Epson serial Parellel boards with external dip switches for easy access and internal IK buffer. It offers a high specification at a low price. **£229.00**

EPSON LQ800

24 Pin Dot Matrix Printer offers a high 200 CPS draft speed and near letto quality at 67 CPS with high resolution graphics and a variety of fonts **£585.00**

ALSO AVAILABLE

Epson FX 85	£365.00
Epson FX 105	£495.00
Seikosha GP 50A (Parallel)	£69.00
Seikosha GP 50S inc. Printer I/F + cables	£69.00
Canon PW 1080A (NLQ)	£249.00
Canon PW 1156A	£379.00
Brother EP 44	£228.00
Shinwa CP 80A	£189.00
MP 165	£240.00

DAISYWHEEL PRINTERS

QUENDATA DWP 1120

with optional tractor/sheet feeder and 13" paper with facility.
This Daisywheel printer with 20 CPS has 96 character printwheel compatible with the QUME.
Standard centronics interface. (optional RS232 C) **£169.00**

Brother HR 15	£349.00
Juki 6100	£285.00
Juki 2200	£275.00
Juki 6300	£799.00

COLOUR PRINTERS

Canon PJ1080A	£440.00

TRACTOR ADAPTERS

FX85	£33.00
LX80	£23.00
Juki 6100	£129.00
Juki 6300	£129.00
Quendata DWP 1120	£114.00
Brother HR 15	£95.00
LQ 800	£43.00

SHEET FEEDER

Juki 6100	£173.00
Juki 6300	£173.00
Quendata DWP 1120	£165.00
Brother HR 15	£212.00
LX80	£55.00

RIBBONS

Full selection of Ribbons available.
Call for latest prices & availability.

FONT AID

NLQ Designer for Canon and Taxan KAGA NLQ Printers.
Design your own NLQ Fonts or download one of our 20+ predifined fonts. The Fontaid Disk includes the following type styles:- Square, Outline, Gothic, Bold, Computer Type, Bold Shadow, and Broadway.
Additional Disk 'A' Includes:- Greek/Matus Script, P.S., Plain Handwriting, and 2 styles of Elite, Condensed, & Super Condensed.
Fontaid requires 6264 RAM CHIP in printer.

Fontaid BBC	£30.00
Fontaid additional Disk	£15.00
ROMS of individual fonts	£18.00

CREDIT FACILITIES

Full credit facilities now available
- LOW DEPOSITS
- FAST FRIENDLY SERVICE
- UP TO 3 YEARS TO PAY

Typical APR 36.3%

Accessories

Raven Discs Double Sided, Double Density 96 TPI uses 3M media. Guaranteed for life. Free Library Box included **£17.00**

EPROMS

2764	£2.20
27128	£3.95

RAMS

6264 LP 15	£3.95
EPROM Extactor	£5.00
EPROM Eraser	£32.00
Soft Life EPROM Blower	£75.00

COMPUTER

BBC dust cover vinyl	£3.50
Data recorder complete BBC lead	£24.95
Tracker Ball	£59.00
GRAFPAD II	£59.00

JOYSTICKS

Voltmace 14b Handset	£14.95
3b Singlet	£12.95
3b Duelset	£19.95
14b Interface	£14.95
DRAWER Cassette	£5.95
DATAPAD Keyboard	£39.95

DISC STORAGE

10 × 5¼ Library case	£2.00
70 × 5¼ Lockable	£9.95

SERIAL INTERFACES

EPSON 8143	£34.00
JUKI	£58.00
CANON	£91.00
KAGA	£85.00
Epson 8148 + 2K buffer	£65.00

LISTING PAPER

11" × 9½ 2000	£14.00
Teleprinter Roll	£4.50
Teleprinter Roll Holder	£14.00

PRINTER LABELS

1000 90 × 36mm 1 across	£5.70
1000 90 × 36mm 2 across	£6.70
1000 90 × 36mm 3 across	£7.70

PRINT FEED SYSTEM

Revolutionary low cost Printer Feed System tidies up all Micro Desks–No more paper on the floor. **£ 35.00**

MONITOR ACCESSORIES

Monitor stands single	
Monitor stands double plynth Metal	£21.00

BBC BOOKS

BBC B Compendium	£5.95
Advanced Disk User Guide	£14.95
Advanced Basic Rom User Guide	£9.95
The Epson FX Kaga Printer Commands Revealed	£5.95
BBC Micro Disk Disk Drives	£6.95
Complete Disk Manual	£7.95
The BBC Micro Rom Book	£9.95
The Super User's BBC Micro Book	£9.95
View BBC	£10.00
View Store	£10.00
Viewsheet Electronic S/Sheet BBC	£10.00
Wordwise Plus	9.95

AMX MOUSE & SOFTWARE

AMX Mouse with Super Art ROM	£79.00
AMX Pagemaker	£49.95
AMX 3D Zicon	£24.95
AMX Database	£24.95
AMX XAM	£24.95
The Original AMX art Plus Utilities	£14.95
AMX Paintpot	£14.95
AMX Desk	£24.95

SYSTEM SOFTWARE

THE MUSIC SYSTEM

Disk Pack	£29.95
Cassette 1	£14.95
Cassette 2	£14.95

EXPANSION BOARD

Computer Concepts Sideways Board	£45.00

RAMAMP

RA20 +44	£79.00
RA32N	£59.00
RA32+	£58.00
ROM6S	£32.00
RAM16	£32.00
WPK for all above	£5.00

BBC Firmware

FIRMWARE

Acorn View Word Processor	£52.00
Acorn View Sheet	£52.00
Acorn Logo ROM	£65.00
Acorn ISO Pascal	£65.00
Acorn BCPL	£99.00
GXR	£29.00
GXR B+	£29.00
View 3.0	£85.00
Hi-View	£55.00
View Store	£52.00
LISP ROM	£49.00
BASIC Editor	£28.00
Termulator	£31.95
Microprolog	£69.95

COMCONCEPT

Wordwise	£36.00
Wordwise Plus	£46.00
Intersheet	£55.00
Disk Doctor	£27.00
Printmaster (Epson)	£27.00
Printmaster (Star)	£27.00
Caretaker	£27.00
raphics ROM	£27.00
Communicator	£59.00
Accelerator	£55.00
Gremlin Debug ROM	£27.00
Interchart	£33.00
Speech ROM	£30.00
Speech Processor	£10.00

BEEBUG

Toolkit ROM	£26.45
Toolkit Plus	£39.00
Wordease	£29.00
ICON Master	£34.00
Studio Eight	£22.00
ROMIT	£34.00
Sleuth ROM	£28.00
Help ROM	£24.00
Exmom II	£28.00
Spellcheck II	£29.00
Spellcheck Wordwise	£29.00
Spellcheck View	£29.00

CLAIRES

Frontwise Plus	£19.00
BROM	£34.00
Wordease	£27.00

ALTRA

Enigma Dish Imager	£42.00
Tube Editor	£42.00
Probe I	£34.00
Basic Editor 2	£34.00
Basic Editor I	£25.00
First Aid II	£19.00

GEMINI

Datagem Database	£79.00

LBO

Life & Business Organiser	£19.50

PACE

Commstar	£33.00
System ADE ROM	£60.00
System SPY ROM	£30.00
Edward User Pack	£44.00
Edward Teacher Pack	£25.00
BBC Ultracalc	£25.00
Clares B ROM	£32.00

VINE

Replay ROM	£34.00
TD ROM	£18.00

Disc Utilities

View Index	£14.90
View Printer Driver Generator	£10.90
Hi View	£55.20
Acorn Soft Database	£14.25
Clares Database	£21.85
Clares Graphdisc	£12.30
Clares Replica III Disk	£13.95
Clares the Key Disk	£12.30
Betabase Utilities	£11.00
Beta Accounts	£21.95
Profile	£11.00
Micro Text Disk	£55.20
Beebugsoft Design	£18.00
Beebugsoft Masterfile II	£18.00
Beebugsoft Teletext Disk	£10.90
Beebugsoft Sprites Disk	£10.90
Beebugsoft Disk Master	£18.00
Beebug Billboard Disk	£18.00
Beebug Quickcalc Dish	£14.25
Beebug 'Hershey' Font	£14.25
Beebug Paintbox II Disk	£12.30
Office Mate	£12.00
Office Master	£25.00
Fleet Street Editor	£39.95

GAMES DISK

Karate Combat	£11.95
Way of the Exploding fist	£14.95
Reptone II	£11.95
Speech	£11.95

Services

Many components now in stock.
Call for details and price.

SERVICES

Fast Repair Service for the BBC Computer

average charge from	£23.00
Printer repairs from	£20.00
Disk Drive repairs from	£15.00

BBC COMPUTER SPARE PARTS AND COMPONENTS

PSU	£59.00
Keyswitch	£2.00
Complete Keyboard	£59.00
Keyboard Connector	£5.18
UHF Modulator	£5.18
Video ULA	£20.00
Serial ULA	£16.00
6522 VIA	£4.10
6502 2 MHZ CPU	£7.50
UPD 7002	£17.25
6845SP CRT CON	£7.50
SAA 550 Teletext	£10.35
LM 324	£0.50
6522A 2 MHZ VIA	£6.33
8271	£52.00
74 LS 123	£0.46
74 LS00	£0.28
74 LS04	£0.28
74 LS10	£0.28

How to Order

You can purchase any of the items listed. All you have to do is write your requirements on a sheet of paper, and we will despatch your goods within 24 hours, subject to availability.

Please add the following amounts for Postage and Packing.

Items below £10.00	add **£1.50**
Items below £50.00	add **£2.50**
Items below £100.00	add **£3.50**
Items over £100.00	add **£8.00**

(UK Mainland only)
All prices include VAT at 15%
'No Hidden Extras'

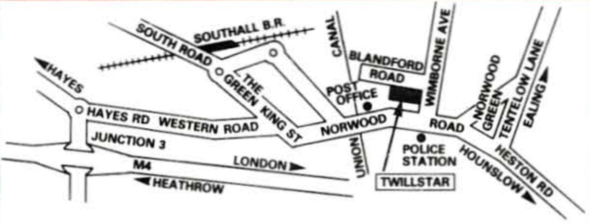
Please enclose your cheque made payable to:

TWILLSTAR COMPUTERS LTD.

Access/Visa Card Holders:
Call us on

01-571 5938 or 574 5271

VISA



TCL

☎

TELEPHONE ORDERS
(01) 574 5271
Telex No. 25247 attn TIL

Twillstar Computers Limited

Apex House, Blandford Road,
Norwood Green, Southall, Middx. UB2 4HD

ALL SOFTWARE AVAILABLE ON 3'' DISKS

CHALICE

SOFTWARE/HARDWARE

ASK ABOUT B+ COMPATIBILITY

VECTOR 1

TAPE TO DISK UTILITY

Features

- + Once only purchase
- + Can save to any disk
- + Very user friendly, help pages on disk
- + 40/80 Format
- + No awkward ROMs, can be used on any machine
- + Can load to all available RAM &400–&7FFF
- = Simply the best tape to disk utility available

Vector 1 versions compatible with Acorn, Opus, UDM, Cumana, BBC+ & Watford (Not 1-42, 1-43) DFS's.

VECTOR 2

DISK UTILITY

Features:

- + 40/80 Format
- + User friendly, menu driven
- + Contains powerful features such as a disk sector editor, Disk Compare, format, verify and track repair
- = The most powerful disk utility available

NEW IMPROVED VERSION (1.40)

Send £2.00 with old disk for upgrade.

Prices: £12.00 each for Vector 1 or Vector 2
£23 for both.

MUST NOT BE USED TO INFRINGE COPYRIGHT

Please specify DFS when ordering

SLIDE MASTER

Specialised database designed for perfect cataloguing of slides, photographs or other similar items. Comes complete with comprehensive manual.
Disc only: please specify 40/80 track

£16.00

MEGA-ROM

The latest release from Chalice software, over 60 commands on a 16K ROM. The range of commands available means that there is something for every BBC user. For the disc user the ROM provides a skewed formatter to speed up disc access, a disc sector editor, disc search, verify and repair utilities, a useful free space command, plus many other handy commands. For the BASIC programmer, commands include search and replace on a global or selective basis, list active variable values, append BASIC program, move and copy lines, bad program repair, a highly effective routine to shrink BASIC programs down to a far smaller size etc. Other commands include disassembly, memory edit, graphics compilation, comprehensive file transfer utility, function key lister, envelope lister, rom lister, rom save, full rom status, switches roms off through <CTRL><BREAK>, send commands straight to a ROM, KEEP command, inverse video command, a command to send codes direct to your printer, memory search, base conversion, display character definitions, close open files and many others. All commands have been chosen on the basis that they are useful and not as space fillers.

NEW LOW PRICE £29.95

HIGHWAY CODE

A program to teach traffic signs.

- ● High resolution colour signs
- ● Concept keyboard option
- ● Learning mode to allow student to learn at leisure
- ● Examination mode

Please specify 40/80 track

Disk only £11.95

CHIP SHOP

27128 (250nS)	**£3.00**
2764 (250nS)	**£2.25**
6264LP	**£3.50**
3271 FDC	**£42.00**

the SCYTHE

The Scythe toolkit contains a version of the VECTOR 1 tape to disc system, which will transfer most protected tapes, but we have not stopped there. The Scythe has been packed with a host of other commands: MDIS, SDIS, MEDIT, KLIST, BASE, ROMLIST, ROMSAVE, NROM, FLUSH, FORMAT, VERIFY, FREE, SFIND, BFIND XLIST, BAD, MRELOC, SLOW, TDISK, VECTOR, ROFF, RON, SECTLOAD, SECTSAVE, MSHIFT & MSWAP. These commands cover everthing from ROM management, utilities for the disc user, aid for the machine code or BASIC programmer, and a set of general utilities of use to all BBC users. The commands will accept input in HEX, DECIMAL, BINARY and the resident INTEGER variables making the Scythe very easy to use. The Scythe comes complete with a comprehensive manual and a free utilities disk.

NEW LOW PRICE £21.95

ROM MASTER

ROM Master is a budget utility ROM designed for people with several ROMs on their BBC computer. ROM master has several utilities to help prevent the interference which can occur between different ROMs, any ROMs that cause problems can be switched off even through <CTRL> <BREAK>. Using ROM master has been designed to be as easy as possible. Most commands will accept lists, so you can, for example, switch off several ROMs with just one command. ROMs can be specified by their socket numbers or their title or even abbreviations of the title. 20 commands are available, please send for full details.

As a bonus feature for anyone who has files they want to keep from prying eyes, ROM master contains the commands SCRAMBLE & UNSCRAMBLE which will encrypt or de-encrypt a file based on an entered password. The encryption used is highly sophisticated so unless you know the correct password the files cannot be read.

PRICE £14.95

Orders to:
CHALICE SOFTWARE, Dept.MU
3 Merlin Way,
Covingham,
Swindon SN3 5AN.

All Enquiries Please Ring:
0793-615026
Dealer Enquiries are Welcome

All prices shown include VAT and p&p. Please add £3.00 per disk if you require 3" disks and specify when ordering.

MicroLink
in association with
TELECOM GOLD

NEWSLETTER

No. 11 July 1986

Scoop from Japan

ONE of the first reports of the arrival of Prince Charles and Princess Diana in Japan on their recent visit, came direct to the UK from a MicroLink subscriber, beating some of the international news agencies to the punch.

Journalist Yuichi Ishikawa timed his message 12.00 BST, 8 May 86, with the subject matter in capital letters: "WELCOME ROYAL COUPLE TO OUR COUNTRY".

He even took time to design on his terminal two flags – the Rising Sun of Japan and the Union Jack.

His message read: "I Japanese subscriber of MicroLink honour to report the Royal Couple from UK landed safely at Osaka International Airport now. We are pleased their visit. Weather: fine. Temp. 70 degF.

"She wear white one piece. Grandson of Emperor, Hironomiya, meet at airport. Today they will stay Kyoto, beautiful old capital of Japan. I wish they see not only traditional Japan but also High Techs.

"Now weather is getting rainy. Did they come with bad weather of England?" he joked.

Exporters pick MicroLink

ONE of Britain's leading import-export organisations has chosen MicroLink as the communications medium for its near 10,000 members around the world.

The prestigious British & Overseas Institute of Import Export Traders is a totally non-profit association run solely by its members who volunteer for election as officers.

It was founded in 1972 by a group of small companies and individuals who pooled their resources and knowledge to start a joint export sales drive to promote their respective products in Europe.

From this small beginning the Institute has grown to be a highly respected organisation with members all over the world.

"As its main function is to bring exporters into contact with overseas importers, it is a logical progression to require a quick and efficient standard means of communication", a spokesman said.

"As a result of this requirement the products and services committee of the Institute recommended all members to start using electronic mail".

Bill Vickerman, chairman, and Bob Pinder, senior exports consultant – both based in Liverpool and already MicroLink users – said they chose MicroLink because it was reasonable in cost and highly effective in its means of communicating with members.

"It is a quick means of spreading the information that our members need to conduct their business efficiently", said Mr Vickerman.

"It is also a British service that is constantly bringing out new and better means of communication and in its way is a vital aid to our continual search for further British export trade".

Key in for world's hotels

MORE good news about the International Official Airline Guide, which was added to MicroLink's growing list of value added services last month.

As well as supplying the very latest data from more than 750 airlines worldwide – with details of $1\frac{3}{8}$ million flights – and ensuring trouble-free and more economical flight arrangements, OAG also takes the strain out of choosing a hotel at the other end of your journey.

The same source that provides you with unbiased, up-to-date flight and fare information now brings a world of hotel and motel listings to your computer terminal.

Through the medium of MicroLink you can press a few keys and view over 17,000 North American hotels, more than 9,000 in Europe and 3,000 in the Pacific area.

You simply tell the OAG Electronic Edition the city you're going to and the location you prefer – near the airport, downtown or in a nearby suburb or resort – and in seconds you get a comprehensive alphabetical listing of hotels and motels in the location you've selected.

These come complete with name, address, telephone numbers, range of room rates and quality ratings.

Opening the golden door

MEMBERSHIP of MicroLink doesn't just mean access to its broad range of communications and other value added services. It also opens the door to a wealth of information on the host Telecom Gold system.

The main MicroLink menu makes it simple to dial up the many fascinating databases on Telecom Gold.

Latest addition to the list is World Reporter, a massive full-text database of international news, current affairs and business information, operated by Datasolve.

Its sources include some of the world's leading news gatherers including the Financial Times, Washington Post, The Guardian, The Economist, New Scientist, News Service of Japan, TASS from the USSR and the BBC.

YOUR chance to join MicroLink – Page 75

The ins and outs of loops

Part 7 of PETE BIBBY's series for the micro novice

IN our last look at FOR ... NEXT loops we introduced the command STEP which allowed us to vary the amount the control variable changed for each time round the loop.

This time we'll be taking another look at FOR ... NEXT loops, but concentrating on what are known as nested loops.

And what, you may well ask, is a nested loop? To put it simply it's a loop inside another loop. By now you should be used to the idea that a FOR ... NEXT loop consists of the loop control structure – the FOR and the NEXT.

Inside this come all the lines we want repeating, the body of the loop. Now what if the body of the loop is itself a loop? Program I poses the question.

Program II goes the whole hog and actually has one loop inside the other. Run it and you'll see it produce the following output:

```
Outer loop cycle number 1
Inner loop cycle number 1
Inner loop cycle number 2
Inner loop cycle number 3

Outer loop cycle number 2
Inner loop cycle number 1
Inner loop cycle number 2
Inner loop cycle number 3

Outer loop cycle number 3
Inner loop cycle number 1
Inner loop cycle number 2
Inner loop cycle number 3
```

It's not very exciting, but it does show nested loops in action. There's obviously an outer loop with the control variable *outer* and an inner loop controlled by *inner*.

But how do they work? To answer that question let's have a look at Program III, a very simple listing with one FOR ... NEXT loop in it.

Elegant, isn't it? All it does is produce:

```
**********
```

The FOR ... NEXT loop cycles 10 times, printing out an asterisk each time round. The semicolon at the end of line 30 ensures that they all appear on the same line.

The final PRINT just moves the cursor to the next line down at the end of the program. Try leaving both out and see what happens.

Now suppose that you wanted, for reasons best known to yourself, five of these rows of 10 asterisks. You could get them by writing a program that uses the FOR ... NEXT loop of Program III five times in succession.

However there's a much better way of doing it as is demonstrated by Program IV. Run it and see what happens. Exciting, isn't it?

```
10 REM  Program I
20 FOR loop=1 TO 3
30 PRINT "Suppose this was a loop"
40 NEXT loop
```

Program I

```
  10 REM  Program II
  20 FOR outer=1 TO 3
  30 PRINT "Outer loop cycle number
";outer
  40 REM Inner loop starts
  50 FOR inner=1 TO 3
  60 PRINT "Inner loop cycle number
";inner
  70 NEXT inner
  80 PRINT
  90 NEXT outer
```

Program II

```
10 REM  Program III
20 FOR asterisk=1 TO 10
30 PRINT "*";
40 NEXT asterisk
50 PRINT
```

Program III

Some of the program is familiar. Lines 40, 50 and 60 are taken directly from the previous program. The FOR ... NEXT loop formed by these lines obviously produces the rows of 10 asterisks. But how do we get five of these rows?

The answer to that is that we've put the FOR ... NEXT loop we've lifted from Program III into another FOR ... NEXT loop formed by lines 20 and 90.

This outer FOR ... NEXT loop cycles five times as the variable *row* goes from 1 to 5. Each time round the loop the program performs the lines that it finds sandwiched between the FOR of line 20 and the NEXT of line 90.

Now these lines in themselves happen to form an inner FOR ... NEXT loop with the control variable *asterisk*. When it comes to this loop the micro obeys it in exactly the same way as it did in Program III, producing the required line of 10 asterisks.

Then after a REM and PRINT for neatness's sake the program comes to the NEXT of line 90.

Now unless the control variable *row* is greater than 5, the program goes back to the corresponding FOR of line 20 and the whole thing begins again. Hence the five rows of 10 asterisks:

```
**********
**********
**********
**********
**********
```

To put it another way, there is an

```
10 REM  Program IV
20 FOR row=1 TO 5
30 REM Inner loop start
40 FOR asterisk=1 TO 10
50 PRINT "*";
60 NEXT asterisk
70 REM Inner loop end
80 PRINT
90 NEXT row
```

Program IV

outer loop – with control variable *row* – and an inner loop – with control variable *asterisk*. The outer loop is repeated five times.

The first time round the outer loop *row* is equal to 1. The program then meets the inner loop and obeys that, the control variable *asterisk* going through all its values from 1 to 10. This produces one line of asterisks.

Now the inner loop is finished, the program carries on to the following lines and comes to the NEXT of line 90.

Since *row* is only 1 the outer loop is still operating. The outer loop control variable *row* is now increased by one, becoming 2, and the outer loop begins again.

The program carries on and meets the inner loop again. And once more it obeys it 10 times, with the resultant row of asterisks.

When the inner loop has finished its work the program carries on, finds that it hasn't yet satisfied the conditions of the outer loop and so performs it yet again – *row* now being 3.

The program only finishes when the outer loop has been performed five times, with the inner loop going through all its 10 cycles for every pass of the outer loop.

Program V shows this happening. Notice how in line 30 I've used the control variable *row* to give the number of the cycle. The result is:

```
Outer loop cycle 1
**********
Outer loop cycle 2
**********
Outer loop cycle 3
**********
Outer loop cycle 4
**********
Outer loop cycle 5
**********
```

which shows how the loops combine to produce the output.

Now that we've seen how we can have one FOR ... NEXT loop nested inside another Program II should make a lot more sense. Let's see what else we can do with them. Have a go at Program VI.

This is much the same as the previous programs. There's an outer loop with a control variable *row* taking values from 1 to 5.

The inner loop however is slightly different. It still has the control variable *asterisk*, but now it is taking values from 1 to *row*. Run the program and you'll find that you get a triangle of asterisks:

```
*
**
***
****
*****
```

If you manage to control your excitement it's easy to see what's happened. The outer loop behaves just as before with *row* being 1, then 2 and so on to 5.

The inner loop goes through all its cycles for each pass of the loop, again just as before.

What's different is that the inner loop's control variable goes through the range 1 to *row* each time, and not 1 to 10 as previously.

This means that the number of times the inner loop is performed – and hence the number of asterisks printed each time round the outer loop – depends on the value of *row*.

The first time round the outer loop *row* is 1 and so the inner loop only produces one asterisk. The second time round the outer loop *row* has the value 2. This means that the control variable of the inner loop, *asterisk* now ranges from 1 to 2.

The inner loop cycles twice and we get two asterisks. When *row* becomes 3 the inner loop cycles three times with three asterisks being printed on that line, and so it goes on.

If you can't understand it try working through the program line by line, noting down the values of *row* and *asterisk* at each step. You'll soon see what happens.

Remember that the inside loop goes through all its cycles for each time round the outer loop. All we've done is to make the number of cycles of the inner loop dependent on how many times the outer loop has been performed.

All this putting asterisks on the screen leads naturally to an extension of the PRINT command, TAB. To see what it does ask yourself how would you get an asterisk on the screen five character spaces in from the edge? One way would be to use:

```
PRINT "    *"
```

where our asterisk is preceded by four spaces.

This does the job but it's messy. A much nicer way is to use TAB. By now you should be used to the PRINT command telling the micro to display something on a screen line. Well the TAB command tells it where on the line to print it. The solution to the problem is:

```
PRINT TAB(4) "*"
```

The number in the brackets after the TAB tells the micro how many character spaces in from the left of the screen to print whatever comes next – in this case the asterisk.

It may seem odd that it's 4 and not 5, but this is because computers start counting at 0, not at 1 as we do. So the far left space on a line is numbered 0, the

```
 10 REM  Program V
 20 FOR row=1 TO 5
 30 PRINT "Outer loop cycle ";row
 40 REM Inner loop start
 50 FOR asterisk=1 TO 10
 60 PRINT "*";
 70 NEXT asterisk
 80 REM Inner loop end
 90 PRINT
100 NEXT row
```

Program V

```
10 REM  Program VI
20 FOR row=1 TO 5
30 FOR asterisk=1 TO row
40 PRINT "*";
50 NEXT asterisk
60 PRINT
70 NEXT row
```

Program VI

→

```
10 REM  Program VII
20 FOR row=5 TO 1 STEP -1
30 FOR asterisk=1 TO row
40 PRINT "*";
50 NEXT asterisk
60 PRINT
70 NEXT row
```

Program VII

From Page 85

next 1, the next 2 and so on. Try:

```
PRINT TAB(0) "*"
PRINT TAB(1) "*"
PRINT TAB(35) "*"
PRINT TAB(90) "*"
PRINT TAB (8) "*"
```

and see what happens. Incidentally the last one is a deliberate mistake and shows what happens if you inadvertently put a space between the TAB and the opening bracket of the following number.

Not only can you use PRINT TAB to display anywhere on a line you can also use it to pick which line you want to print at. This is done by having another number inside the brackets.

This tells the micro how many lines down from the top of the screen you want the output. And again the top line is numbered 0, the second line down 1 and so on. The whole command takes the form:

```
PRINT TAB(column,row)
```

or

```
PRINT TAB(across,down)
```

if you find that easier. Try the following – preferably after clearing the screen with CLS:

```
PRINT TAB(0,0) "*"
PRINT TAB(5,5) "*"
PRINT TAB(19,4) "*"
PRINT TAB(100,100) "*"
```

and you'll soon have the hang of it.

After that diversion let's get back to using FOR . . . NEXT loops to put more asterisks on the screen. Try out Program VII.

This is more or less the same as the previous program except that a STEP of −1 is used to make *row* take decreasing values from 5 to 1. This means that our triangle of asterisks is now upside down:

```
*****
****
***
**
*
```

I'll leave it to you to figure out the exact details.

```
10 REM Program VIII
20 CLS
30 FOR column=0 TO 19
40 FOR row=0 TO 19
50 PRINT TAB(column,row)"*"
60 NEXT row
70 NEXT column
```

Program VIII

Our previous two programs have used the control variable of the outer loop to influence the inner one. It's very often the case that the control variables that are used to govern our loops are also used inside them. Take a look at Program VIII which produces a quadrilateral of asterisks.

PROBLEM

I HAVE a BBC Micro, issue 4 Board, OS 1.2. Recently it has developed an annoying fault. When playing games sound is breaking up the picture.

I am using a portable TV as a VDU, but there is no such problem when using it as an ordinary TV even with the sound turned full up. Can you please suggest a remedy?
– Edward Dipple, Reading.

SOLVED

Some combinations of TV and computer cause sound-on-vision. You could have a TV engineer adjust the sound trap notch filter on your TV. Alternatively cut the power lead into the modulator and insert a 10R resistor, then connect a 50uF capacitor between the modulator side of the resistor and the modulator case.

```
10 REM Program IX
20 CLS
30 FOR row=0 TO 19
40 FOR column=0 TO 19
50 PRINT TAB(column,row)"*"
60 NEXT column
70 NEXT row
```

Program IX

Here we have yet another pair of nested loops. The outer loop has the control variable *column* which varies from 0 to 19. The inner loop has *row* as its control variable. The interesting part is line 50 which uses the values of *row* and *column* with TAB to position the asterisks.

Each time round the outer loop the inner loop cycles 20 times, producing a column of asterisks. The next time round the column is one space to the right an so on.

Program IX does the same thing but in a different way. Now the output appears row by row. This is because the outer loop of Program VIII is the inner loop of Program IX and vice versa.

And that's all for now. We've seen how loops can be nested inside each other and how the control variable of the outer loop can be used to influence the inner loop.

We've also seen how the loop control variables can be used inside the loops, in this case deciding the position of the asterisks.

● *I'll leave you with this problem until next time. Both the triangles of asterisks had their hypotenuses to the right. Can you modify them so that the triangles have their hypotenuses to the left as in Figure I and II? Have fun trying.*

```
    *
   **
  ***
 ****
*****
```

Figure I

```
*****
 ****
  ***
   **
    *
```

Figure II

★ TUBE USERS ★ RGB MONITOR USERS ★ ROM/RAM USERS
★ DISK USERS ★

Beebaid

A new ROM from
Jaysoft

Master your Model B

BEEBAID offers model B users the following Master facilities: Tube switch on/off commands, more effective use of the shift key, interlace correction in graphics modes; and for users with battery backed Ram, can enable/disable Roms across even a power off. BEEBAID users need never key CHAIN, LOAD, •RUN, •ACCESS, •LOAD, •COPY, •COMPACT, •INFO, •DUMP, •TYPE, •DELETE, •EXEC commands ever again! Why BEEBAID? Simply Because Each and Every Beeb needs Automatic Interactive Displays!

ROM SOCKET DISPLAY

```
SOCKET        TITLE
F Write
E             AUTO BEEBAID 0.05
D             BASIC (C)1982 Acorn
C             DISC DOCTOR 1.09
B             TOOLKIT1.21
A             DFS,NET(C)ROFF
9             WORDWISE-PLUS1.49
8 Write
7             FX-80 PRINT 1.00
6             BEEBMON1.00
5             The BASIC Editor 1.32
4             BASIC(C)1983 Acorn
3 Disable
2
1
0
Socket F in control
```

•AUTOMATIC FEATURES

Permanent cure for screen jitter in graphics modes – essential if you've spent a fortune on a monitor!
HI-BASIC automatically selected when 6502 second processor active.
Shift key switched for ease of keying lower case BASIC variable names.
Increases the speed of that slow keyboard by 30%!
Automatically prevents disks being permanently disabled by some games – no need for power off.

•ROM CONTROL

Elegant mode 7 colour display of Rom/Ram sockets showing Rom title and read/write/disable status.
Switch Roms off and on – permanently for users of battery backed Ram – even across a power off! (Like the Master Series).
Copy Roms to disk by name or socket number.
Transfer any Rom to sideways Ram.
Query read/write/disable status of Rom/Ram sockets.
Handles multiple sideways Ram sockets.
Tested with ATPL, Solidisk, Watford and Acorn User Ram extensions.

LOAD MENU DISPLAY

```
Drive 0 01--SAMPLE Load   Menu
______________________________

A  $.!BOOT        B  B.METEORS
C  =.METEORS      D  M.ARCADEN
E  B.DEFENDR      F  =.DEFENDR
G  R.AUTOBEE      H  R.The BASI
I  B.CANDLE       J  B.VULTURE
K  +.JBEPSON      L  B.MATCH
M  M.FEASIBL      N  -.UNLOCK
O  B.DISPROG      P  +.DISPROG
Q  B.DFSPACE      R  B.LOADMNU
S  B.TITLES       T  B.LOADER
______________________________
```

•MENU FACILITIES

Three menus available, Load menu, Run menu, and Disk Free Space display. All Menus are mode 7 colour displays accessible using a • command, or more efficiently using L/Break, M/Break and O/Break.
Menus are 'networked', switch between them at the touch of a key.
Load menu loads BASIC programs and automatically lists them with page mode set on – with a single keystroke! However, if you have The Acorn BASIC Editor Rom in your machine, it is entered with insert mode set.
Load menu also loads machine code programs at the correct address for subsequent disassembly. Automatically detects a Rom and prompts for a destination Ram socket.
Touch the COPY key and invoke the Copy menu. Select the files, select the target drive, and BEEBAID does the rest for you. Handles duplicate files, locked files and multiple destination drives.
The Run menu enables BASIC and machine code programs to be executed easily – by all the family! Supersedes all other well known Run menus – B, B+, Master and Tube compatible.
Disk Free Space Display shows the size of all files on a disk and the location of the free space. Touch a key to swap between hex and decimal. Hit 'C' for automatic compact.

DISC FREE SPACE DISPLAY

```
Drive 0 01--SAMPLE        80 Track
FILENAME  SIZE FREE FILENAME  SIZE FREE

  Catalogue
$.!BOOT     1       B.METEORS   4
=.METEORS  34       M.ARCADEN  76
B.DEFENDR   6       =.DEFENDR  35
R.AUTOBEE  64       R.The BASI 64
B.CANDLE    3       B.VULTURE  28
+.JBEPSON  11       B.MATCH    24
M.FEASIBL  71       -.UNLOCK    2
B.DISPROG   1       +.DISPROG   1
B.DFSPACE   1       B.LOADMNU   1   49
B.TITLES   20       B.LOADER    3  299

Largest free space:           299 sectors
Total free space:             348 sectors
Catalog entries:              20 Free: 11
```

•AND MUCH MORE

Dump the current text window to the printer with •DTWindow.
Zeroise memory segments using •ERASE commands, including selectable Ram sockets.
Turn the Tube on and off using •TUBEON and •TUBEOFF. Preserves status of text or programs held in second processor.
Relocate any memory segment with •SHIFT.
Relocate any BASIC program with •MOVE.
Disable the Econet system using •NONET.
Load a program to the correct address using •DOWNLOAD.
Enhance your BBC Micro with some 20 additional Break commands.

•DISK FILE INDEXING SYSTEM

In addition to all the facilities already listed, the BEEBAID Rom is supplied with a Disk File Indexing system. This system automatically maintains an index of all your software and allows you to categorise your programs, eg. Games, Educational, Simulation etc. It can be dynamically tailored to your own requirements, eg. your disk drive configuration and which directories you want to index. The Index may be searched by program name, disk number or category. It is supplied on a 40/80 compatible disk with its own bound manual and it is FREE!

BEEBAID is fully 6502 second processor compatible and has been tested on model B, B+ 128 and Master Series machines using the Acorn DFS. It has been tested with several sideways Ram boards including ATPL, Watford, Solidisk and Acorn User, using single and multiple Ram sockets. It has also been compatibility tested with many other Roms including the VIEW family, Wordwise and Wordwise Plus, AMX Mouse, Disc Doctor, BITSTIK, Teletext, Prestel and many more. BEEBAID eliminates conflicting Rom problems.

To order your copy of BEEBAID, simply fill in the cutout and send it with a cheque or postal order payable to:

JAYSOFT at:
114 KINGSWAY, WEST WICKHAM,
KENT BR4 9JQ

Please send me .... BEEBAID packages comprising 16K Rom, 40/80 compatible disk and 2 manuals at £34 inclusive. I enclose a cheque/postal order for £ ....
Name ....
Address ....
....
....
....
Order dispatched by return of post.

Le Modem smooths comms connections

MICHAEL NOELS reviews an exceedingly helpful black box

ONE of the nice things about working for *Micro User* is that you get to see all the latest products in return for doing a review. And there was quite a list of people waiting to get their hands on Le Modem. Fortunately a few pounds spent on the editor at the Ram and Buffer ensured me the job.

And money well spent it was. Le Modem is a multi-baud rate, auto-answer, autodial modem for the BBC Micro from Watford Electronics for the incredibly low price of £89.

The immediately apparent feature is the lack of knobs or buttons on its sleek 6 × 9 × 2 inch case – just a set of four monitor LEDs (power, tx, rx and on line) plus RS423 lead and ribbon cable. This ribbon cable, which clips into the 1MHz bus carries the signals needed over and above those of the RS423 port for the auto functions.

Once you've connected up cable and lead all that remains is to plug in the ROM-based software – something we should all be used to doing by now – and you're away.

If you've ever had any experience of modems you'll know the frustration that comes with your first experiments. Am I doing something incorrectly, is the software being stupid, is the other end of the comms link down or have I just got the leads the wrong way round?

With Le Modem there's none of this, thanks to its self-test mode. The simple *TEST command puts you into a routine that checks its four baud rates (300 answer and originate, 1200 and 75 baud) giving you aural feedback through the internal speaker and the usual success messages. Very reassuring.

In all – remembering that my lid's never screwed down – it took me about 10 minutes to get from unpacking the box to the successful message stage.

Then came the first logging on, and the discovery of one of the outstanding features of Le Modem: The ease with which you can get through to the really important databases such as Prestel and MicroLink.

I opted for Prestel first. This section of Le Modem is called appropriately enough, Le Prestel. With a simple:

```
*CALL PRESTEL 618
```

I was in. Prestel was automatically dialled and I was at the familiar header frame. From then on all was plain sailing. In fact, since Le Modem's special features are function key driven, I was able to access them simply by following the key strip. Figure I shows what's available.

Straight away I was experimenting with saving pages – these automatically go onto the V directory – and printing them off. The printer driver is necessarily rudimentary because of space considerations. It ignores graphics totally, just giving you the text.

Mind you, if you're versatile enough to write your own graphics dump, Le Prestel can accept it. There's a special key for a user function which allows you to call your own machine code routine.

Another useful feature is the ability to tag pages. This allows you to mark special pages which you can return to at a keystroke. If you've every been lost in the Prestel maze you'll know how handy this can be. In fact you can tag up to three pages, allowing you to mark deeper and deeper nodes as you get further into Prestel.

After three tags, a subsequent tag causes the first tag to be lost. Once you get used to the system you wouldn't be without it.

Downloading software was just as easy. In fact the hardest part was wading through Micronet to find some to download. Once there a simple key press followed by a filename was all that was needed. The downloading proceeded without a hitch – and not only was I able to save it, while still on line I was able to enter Basic to test it and then return to Prestel with *PRESTEL. Neat.

Sending a mailbox was as easy as everything else had proved. I simply dialled up *77 and sent myself a message, so I could check it was there when I logged off (another single function key feature).

There's also a mailbox editor which

LE PRESTEL										
	RECALL TAG	SEND MAILBOX	LOAD MAILBOX	USER FUNCTION	CHANGE I.D.	LOG OFF	RUN DOWNLOADED PROGRAM	*CAT		LOAD PAGE
	TAG PAGE	EDIT MAILBOX	SAVE MAILBOX	REVEAL	RETURN TO BASIC	DOWNLOAD TELE-SOFTWARE	SAVE PROGRAM	*COMMAND	PRINT PAGE	SAVE PAGE
	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9

Figure I: Le Prestel function keys

L'EMULATOR										
					SPOOL FILE ON/OFF			*CAT		
	LOCAL ECHO ON/OFF	SCREEN COLOUR	CHARACTER COLOUR	SEND ASCII FILE	RETURN TO BASIC	X MODEM TRANSMIT	X MODEM RECEIVE	*COMMAND	FILTER ON/OFF	PRINTER ON/OFF

Figure II: L'Emulator function keys

Le Modem
Watford Electronics
POWER
TX DATA
RX DATA
ON LINE
WE

allows you to prepare and store your own mailboxes inexpensively offline and then despatch them when you're logged on. You need to take care to get your message the right size for the reply form.

To sum up, Le Prestel gave me all I wanted for Prestel communications, working reliably and satisfactorily.

Next on my list of tests was calling MicroLink, Database Publications' own section of Telecom Gold. The part of the software that deals with this is known as L'Emulator, and all it needed was a simple:

***CALL BTGOLD 0618330091**

This automatically dials up the required number, then, when you're through, logs you on at 1200/75 baud with an 80 column screen. There are two possible drawbacks to this.

The first is that if you're interested in sending a lot of characters you may want 300/300 baud to save bills. This is easily remedied. You can:

***CALL BB**

followed by the 300 baud PSS number. Although designed for bulletin boards – hence the BB – it works equally as well with 300 baud Telecom Gold.

The second and more serious drawback is that you're stuck in 80 column mode. There's no optional 40 column mode for those of us without high resolution monitors. This omission was, I am told, due to lack of room in the ROM.

These quibbles aside, the terminal emulation worked fine on MicroLink. I decided to give it as fierce a test as I could manage. L'Emulator claimed to be able to:

- Spool the proceedings on to disc.
- Load and send a prepared Ascii file from disc.
- List the proceedings on printer.

I tried all three at once. I prepared a Wordwise file of electronic mail and then logged on. I then pressed Shift+f4 to select spool file (see Figure II), was told to wait while the current screen was saved, then was asked for the filename I wanted.

On balance, this screen saving is a good idea. Once you resume communications after stopping to issue a command or change a parameter the screen is restored, so you don't lose track of what's going on. It can sometimes be a bit irritating waiting for a screen you don't want to be saved, however.

```
10 *MODEM PRESTEL
20 *DIAL 618
30 TIME=0
40 REPEAT
50 *CARRIER
60 UNTIL ?&3A0<>0 OR TIME=3000
70 IF TIME >= 3000 THEN STOP
80 *AUDIO OFF
90 *SEND
100 *PRESTEL
```

*Program I: Basic equivalent of *CALL*

By now, the proceedings were being recorded by being spooled to disc. I then told MicroLink I was going to send some mail, then pressed f3 to send the prepared file. Again the screen was saved and I was asked for a filename.

At this point the disc drive was being kept busy with information going in both directions. I then chose printer on with f9 and the goings on went to printer as well as disc. Try as I might, I couldn't confuse L'Emulator at all. Everything worked perfectly.

Later experiments with sending and receiving files via the Xmodem protocols were equally successful, as were the tests of the other commands.

So far I'd been trying Le Modem out at a high level, using *CALL. However Le Modem is based on a hierarchy of command functions and *CALL is at the top. Program I shows the Basic equivalent of *CALL using the lower level commands.

There's not room to go into the structure in full, suffice it to say that there are sufficient commands to let you configure the terminal as you want – almost.

The only annoying omission was the lack of a chat mode. This was intentional – the designer reckoned that if you want to chat on the phone you should use your mouth and ears. However this isn't possible for the deaf and even if you're not handicapped this way it's still useful to chat when transferring a set of files, for instance.

You can create a chat mode of sorts, but I found I needed my end of line character to be a line feed only and this isn't supported, though it does give all the other terminators plus local echo, filter mode and handshaking. These can all be altered via the constantly available terminal status screen.

The modem itself is controlled by a section of software called Le Key, mainly by star commands. While they're beyond the scope of this review, they do let you get to grips with the modem operation, as Figure III shows.

I became involved with them when I wanted to test the auto-answer facility. The manual explains them in detail, and within quarter of an hour I knew enough to write Program II, which worked first

→

From Page 89

time. Certainly the scope is there for more sophisticated programs, including bulletin boards. Watford themselves promise more software products based around Le Modem.

However the manual doesn't go into all the details you'd need to write your programs at assembler level. There's no jump block table, for instance.

So how does Le Modem compare with other software/modem combintions? If you're a straightforward user of Prestel, MicroLink or other large mainframe databases, or simply want to log on to bulletin boards, Le Modem is ideal for you. Everything you want is just a star call away.

If you're a dedicated hacker you may find Le Modem's super simple system too pre-packaged and slick for your liking. Comms freaks tend to prefer buttons to press and on-screen control panels to select from rather than the more automated service of Le Modem.

However the majority of comms users are not hackers. They just want to get to their information from remote databases with the minimum of fuss, and that's what Le Modem gives them. The only major drawback is that its BT approval is still in the pipeline. When that comes through Le Modem should achieve the success it fully deserves.

```
10 ON ERROR PRINT "ESCAPE": STOP:
*HANGUP
20 *ANSWER 04
30 IF ?&3A0<>ASC("T") THEN *HANGUP
40 *AUDIO OFF
50 *TERM80
```

Program II: Simple auto-answer

***answer [n]**	Waits for n rings then answers phone checking for 300 then 1200/75 carrier.
***audio [on/off]**	Monitors line via internal speaker.
***call []**	Followed by telephone number, autodials and logs on to one of 11 possible services. For instance, *call prestel.
***carrier**	Checks to see if carrier present.
***data**	Sets data, parity and stop bits of data word from eight different combinations.
***dial []**	Dials following telephone number.
***endcall**	Checks for carrier. If not it hangs up.
***hangup**	Drops telephone line.
***listen**	Grabs telephone line and turns on monitoring by internal speaker.
***modem**	Either displays status or sets modem to a service. For instance, *modem prestel.
***prestel**	Calls Le Prestel.
***reset**	Issues a software reset.
***send**	Sends a carrier.
***test**	Tries out the four baud rates supported.
***term80**	Calls the 80 column terminal program L'Emulator.

Figure III: Le Modem star commands

BBC Users...

High Quality Blank Discs at low low prices

Micro Resources 5¼" Superior Quality Discs carry a Lifetime Guarantee. They come in their own Library case and represent real product excellence at highly competitive prices.

Per box of 10
SS/DD 48 tpi £7.90
DS/DD 48 tpi £10.00
DS/DD 96 tpi £13.90

Nashua 3½" Microdiscs Lifetime Guarantee
Per box of 10
SS/DD 135 tpi £21.74
DS/DD 135 tpi £30.44

Nashua 5¼" Floppy Discs Lifetime Guarantee
Per box of 10
SS/DD 48 tpi £11.00
DS/DD 48 tpi £15.00
DS/DD 96 tpi £18.00

Authorised Nashua Distributor

Micro Resources offer special quantity discount prices for Software Houses and Education Outlets. Prices start at 55p per disc in bulk packed form. Send payment or call us with your Access or Barclaycard number. Orders are despatched within 24 hours. Prices include delivery but exclude VAT. 24 hour answering service.

Access

VISA

MICRO RESOURCES Ltd.
Southfield House, 11 Liverpool Gardens, Worthing,
Sussex BN11 1RY
Telephone Worthing **(0903) 213174**

Master ADFS in action

Part 2 of ROY McCLOY's series on mastering the Master

NOW that my Master 128 was becoming more familiar and part two of the reference manual had arrived I felt ready to take an everyday user's look at what the Advanced Disc Filing System (ADFS) could offer, how EDIT worked, and how on earth could I get the real time clock to print the date in my View files.

I had delayed buying a non-Acorn double density disc filing system (DDFS) for my old Model B because of incompatibility problems although I desperately wanted more disc storage capacity for long data files and text files.

As a mediocre Basic programmer I used to think that I would never need more than one disc for all my program files, plus another for back-up, and the catalog length of 31 filenames was the limiting factor – mitigated to a great extent by the superb Watford DFS with its double length catalog.

Word processing soon brought an end to my contentment and even my double sided 80 track discs seemed to shrink overnight. It wasn't long before I was buying discs in packs of 10. Would the ADFS be the answer? How does it differ from the ordinary DFS? Are the commands the same? Can I transfer all my existing files to a double density disc?

For the technically minded Jim Notman has reviewed the ADFS – *The Micro User* December 1985 – running on a 1770 board in a Model B where it was slow and pushed PAGE up to an alarming &1D00. Fortunately on the Master PAGE remains fixed at &0E00 whatever the filing system and the ADFS runs considerably faster.

The ADFS requires the disc to be formatted with 16 sectors per track instead of the standard 10, thus increasing storage capacity by 60 per cent. The formatting program would not fit into the mega-ROM in the Master and comes on the Welcome disc and is run by: *$.LIBRARY.AFORM.

Now for the good news. The ADFS only supports two disc drives, 0 and 1, but if you have double sided discs and disc drives the disc can be formatted so that both sides – that is drive 0 and 2 under the standard DFS – form one continuous usable surface, which is drive 0 in the ADFS. The same applies to the use of drive 1 – the old drives 1 and 3 – if you have dual drives.

When formatting you respond with S for Small to format one side of a 40 track disc. Similarly M for Medium formats a single sided 80 track disc or L for Large for the maximum storage capacity, of 654.4k on a double sided 80 track disc and available on drive 0 or 1. This compares with 204.4k available per drive – 0, 1, 2 or 3 – on an 80 track disc using the standard DFS.

This is when the few differences in using the ADFS start to become apparent. You cannot read a standard DFS formatted disc when in the ADFS or vica versa. When you place a disc in a drive or change discs it is important to mount it. In the ADFS you no longer have *DRIVE but *MOUNT0 and *MOUNT1 initialise their respective drives.

Typing *ADFS is equivalent to *MOUNT0. If you *MOUNT1 you can then boot files in drive 1 using Shift+Break, provided of course that *OPT4,3 has been used to set the EXECute option on the disc. This very useful facility is not available with the DFS on drives other than zero.

It took me some time to load my first file successfully from an ADFS disc since I kept getting the error message "not found". It was my first introduction to the hierarchical filing system of the ADFS. Not surprisingly the Welcome guide only has five pages out of 250 on the ADFS. The Welcome disc has an ADFS tutor containing about 10 Help pages and four simple tests.

Unfortunately Acorn chose rather meaningless names for their examples of directories. Let me give you a more practical example in Figure I. As in the ADFS, $ is the root directory which is initialised when you *MOUNT the disc. This root directory contains one file, !BOOT, and two directories, View and Programs.

In turn, the directory View contains three more directories – Utils, Letters and Reviews. The directory Utils contains three of my View utility files, F-KEYS which provides my own

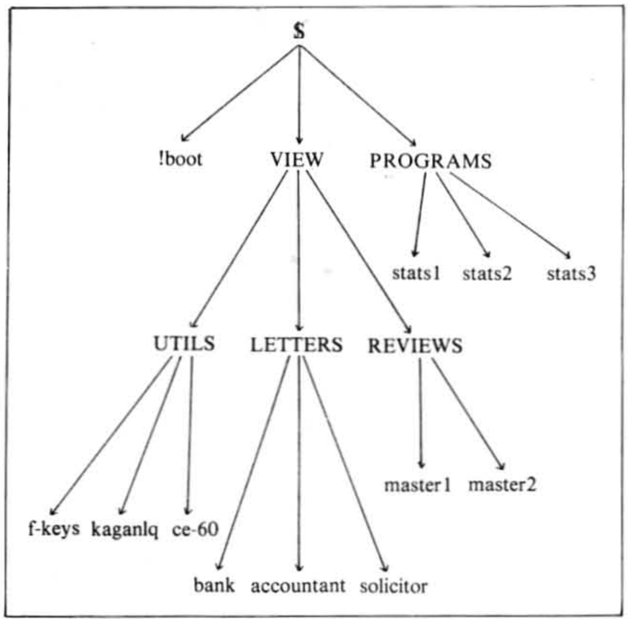


Figure I: ADFS hierarchical filing system – directories in capitals, files in lower case

→

Graphics Design
Program
BEEBUG
J. S. BACH
FEATURE STOP 10
DOUBLE NOTHING
F-FEATURE STOP
EPROM PROGRAMMER
BONUS:56
Body
Amplitude
SIDEWAYS ROM INDEX
ROM NUMBER
ROM TITLE
BASIC
BCPL
EXMON
TOOLKIT
Eprom Form
DFS
WORDWISE
GRAPHICS EXTENSION
BBC
GIANT
TEXT
Level

GET IN THE PICTURE WITH BEEBUG

JOIN BRITAIN'S LARGEST COMPUTER USER GROUP TO GET THE MOST FROM YOUR BBC MICRO

- JOIN BY SENDING £12.90 FOR 1 YEAR MEMBERSHIP (10 MAGAZINES)

  OR £6.90 for 6 MONTHS MEMBERSHIP (5 MAGAZINES).

  OR SEND £1.00 FOR A SAMPLE ISSUE (UK ONLY)

- UK ONLY — OVERSEAS PRICES ON APPLICATION

- MAKE CHEQUES PAYABLE TO BEEBUG DEPT MU1
  PO BOX 109 HIGH WYCOMBE
  BUCKS HP10 8NP

- ***NEWS***
  GAMES
  REVIEWS
  UTILITIES
  GRAPHICS
  SOFTWARE
  DISCOUNTS
  PROGRAMS
  HINTS & TIPS
  USER GROUPS
  INFORMATION
  APPLICATIONS
  SPECIAL OFFERS
  TEN MAGAZINES PER YEAR
  TECHNICAL SUPPORT

From Page 91

function key definitions for View – see *The Business Micro User*, April 1986 – and CE-60 and Kaganlq which are two printer driver programs.

The directory Letters contains three View text files and two more text files are stored under directory Reviews. The directory Programs contains three statistics program files. To load a letter to my bank manager into View I have to type LOAD VIEW.LETTERS.BANK.

The $. can be omitted from the front if you have mounted that disc but to load this text file from a disc in drive 1 while still mounted drive 0 you would have to type LOAD:1,$.VIEW.LETTERS .BANK

In other words you have to specify the pathway to the file via the appropriate directories in the form: Specific filename = $.directory_name(s).filename.

This may seem to involve a lot of extra typing of complex filenames but it makes for very ordered disc filing and it is much easier to remember what various files are for. You are allowed up to 47 files in any one directory so provided you keep creating directories or sub-directories you are not limited to a fixed number of files per disc.

Also the ADFS not only allows up to 10 characters per filename or directory name but the use of wild characters when LOADing and CHAINing files. When in View the bank letter could be abbreviated to LO V*.L.*B* provided all the directories and the filenames in directory Letters have unique first characters.

Another example of the use of the hierarchical directory tree would be CHAIN"$.PROGRAMS.STATS2" or abbreviated to CH."$.P*.S*2" to CHAIN the Basic file STATS2.

You can create directories by *CDIR filename and select a directory by *DIR filename. Once in a directory sub-directories can be created by *CDIR. *TITLE no longer titles the whole disc in the ADFS but titles the current directory. This becomes obvious when you look at the catalog.

CAT (.) does not catalog all the files on the disc as in the DFS but merely the root directory $. Thus in my ADFS example – Figure I – typing *. only produces the list: !BOOT, VIEW, PROGRAMS. The directories are distinguished by the access codes DLR after them, but more of this later. To see the catalog of files and sub-directories in any directory type: *.directory_name. Therefore *.PROGRAMS produces the catalog STATS1, STATS2, STATS3.

Jim Notman outlined the new ADFS commands in his review last December. There are some omissions such as *WIPE and *DRIVE and some changes, for example *SPOOL becomes *SPOOLON.

Two of them, *ACCESS and *COPY, had me stumped for some time before I realised that they had a different syntax from their DFS equivalents. When I first copied some files to an ADFS disc and tried to run them I kept getting an "access violation" error. In order to load or run a program or file you must have read access: *ACCESS directory_name.filename R. Similarly write access is set by *ACCESS directory_name.filename W.

I therefore set read/write on all my files on disc (unlocked) by *ACCESS *.* WR and lock them all by *ACCESS *.* WRL. Typing *ACCESS *.* L would lock all files but remove read/write access, hence the cause of the access error message after I first locked a file this way and then tried to CHAIN it.

*COPY has the syntax: *COPY :source_drive.source_dir.filename :destination_drive. destination_dir

Thus *COPY $.PROGRAMS.STATS 1 $. copies the file STATS1 from directory PROGRAMS to the root directory $. Similarly *COPY :0.$.VIEW .LETTERS.BANK :1$.NEWVIEW copies file BANK from drive 0 to directory NEWVIEW on drive 1 provided that this directory already exists on the disc in drive 1.

You cannot copy files from an ADFS disc to a DFS disc in this way just as you cannot *BACKUP from a DFS formatted disc to an ADFS disc or vica versa. That is where you need the very useful utility program Copyfiles from the Welcome disc which will transfer files either way between DFS and ADFS discs.

I found the copy mode L, for list, a powerful option in this program particularly if you answer the source file specification with an asterisk to copy all files across in one go.

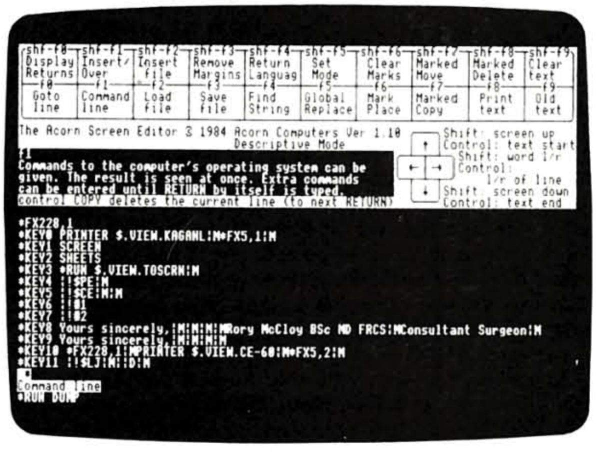
The Advanced Disc Toolkit ROM from Advanced Computer Products which I mentioned in my first Master article last month, and which was reviewed in the February issue, has the command *XFER as one of its invaluable ADFS commands. *XFER will transfer single files between disc filing system, drives and can rename the directory/filename at the same time.

Transferring to the ADFS was well worth the effort. The differences in commands and syntax are minor and the hierarchical tree filing system is very logical with no practical limits to the number of files that can be stored in the catalog.

A major in-built feature of the Master is the editor. It provides very powerful text editing facilities with all the features of a full word processor but does not format text on the screen unlike View. It is therefore very like Wordwise to use, with formatting commands embedded in the text.

The editor can be used at many different levels of complexity and I found it very easy to get into at an elementary level. Mind you, with only

→



```
The Acorn Screen Editor © 1984 Acorn Computers Ver 1.10
                         Descriptive Mode
f1
Commands to the computer's operating system can be
given. The result is seen at once. Extra commands
can be entered until RETURN by itself is typed.
control COPY deletes the current line (to next RETURN)

*FX228,1
*KEY0 PRINTER $.VIEW.KAGANL|M*FX5,1|M
*KEY1 SCREEN
*KEY2 SHEETS
*KEY3 *RUN $.VIEW.TOSCRN|M
*KEY4 |!$PE|M
*KEY5 |!$CE|M|M
*KEY6 |!01
*KEY7 |!02
*KEY8 Yours sincerely,|M|M|M|MRory McCloy BSc MD FRCS|MConsultant Surgeon|M
*KEY9 Yours sincerely,|M|M|M|M
*KEY10 *FX228,1|MPRINTER $.VIEW.CE-60|M*FX5,2|M
*KEY11 |!$LJ|M|!D|M
*
Command line
*RUN DUMP
```

Figure II: The editor screen in descriptive mode

From Page 93

10 pages devoted to it in the Welcome manual I did not appreciate it could do much more.

However when part two of the reference manual arrived with 67 pages of instructions I began to realise just what potential the editor has. For now I will stick to the simple uses, and deal with the wide-ranging formatting power and commands next month to show how it can be used for word processing. Undoubtedly most users will find that it is ideal for creating or editing Basic programs.

It is vital to appreciate that the editor only uses text files – that is, sequences of characters stored as an Ascii code. Therefore you can enter editor by *EDIT, and the memory buffer will be empty, or *EDIT filename which will load the specified file from disc into memory – but it cannot be a Basic program.

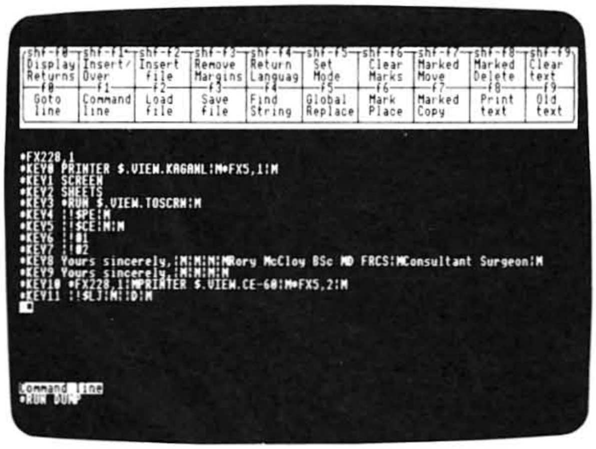
If you want to edit a Basic program file all the Basic keywords do not exist as Ascii code but in a special tokenised form. One answer would be to SPOOL it, but on the Master Basic 4 has the command EDIT which converts the tokens into appropriate Ascii values.

To use this command you have to be in Basic, then LOAD the program file and type EDIT (without the *) when you will enter the editor and find that the line numbers have gone.

At first the editor will appear in Mode 131 – Mode 3 with shadow memory on – in the full descriptive (D) mode and is shown in Figure II editing my text file for defining the function keys in View.

Further Help prompts appear in another screen window within this information screen area as you use various command functions. While it looks impressive and is helpful for the first few times you use the editor, it does seriously limit the amount of text you can see on the screen at any one time.

It doesn't take long to become familiar with the use of the keys and you don't need all the screen information that the descriptive mode provides. It is then preferable to go to the keyword (K) mode which leaves you with the function key definitions in a window at the top of the screen (Figure III) and more room on the screen for your editing.



```
*FX228,1
*KEY0 PRINTER $.VIEW.KAGANL!M*FX5,1!M
*KEY1 SCREEN
*KEY2 SHEETS
*KEY3 *RUN $.VIEW.TOSCRN!M
*KEY4 !!$PE!M
*KEY5 !!$CE!M!M
*KEY6 !!@1
*KEY7 !!@2
*KEY8 Yours sincerely,!M!M!M!MRory McCloy BSc MD FRCS!MConsultant Surgeon!M
*KEY9 Yours sincerely,!M!M!M!M
*KEY10 *FX228,1!MPRINTER $.VIEW.CE-60!M*FX5,2!M
*KEY11 !!$LJ!M!!D!M
```

```
*RUN DUMP
```

Figure III: The editor in keyword mode

This mode has little advantage over the straight numeric mode – 0, 1, 3, 4, 5, 6 or 7 – with no screen window apart from the status line at the bottom of the screen, and using the card keyboard strip provided with the computer. In this case you are left with virtually the entire screen to visualise your program/text file.

The D and K modes obviously use Mode 128 – Mode 0 with shadow memory on – for their screen displays. The mode in which you last used the editor is stored in the battery back-up CMOS RAM and this saves you resetting your chosen mode each time you enter the editor.

Text files can be loaded and saved directly using the keys f2 and f3 and I find the editor very useful for making quick changes to, or creating, !BOOT and EXECute files which are of course Ascii text files.

Basic programs have to be loaded into Basic and entered using EDIT as described above. After editing they cannot be saved as a text file with f3 but you have to return to Basic, using Shift+f4 and this retokenises all the keywords and carriage returns.

If you are creating a new program you then type each line of your program without numbers on a new line – that is, followed by a Return. The first line of your program should be simply AUTO.

You cannot save this text file using the return to language method instead you save it as a text file with f3 and then *EXEC text_filename. This will load the program into memory and use the Basic command AUTO to add the line numbers for you. You can then SAVE or RUN it as a normal Basic program.

I mentioned the real time clock last month and how the time can be displayed using *TIME. The time or date function can be entered into a View text file so that when it is printed or screened it uses the current date or time. My secretary finds this very useful when she is printing out letters and memos which may have been entered a day or so earlier.

But how do you do it? The manuals don't tell you, but I later found out that they could be entered in the View text using ¦D for the date and ¦T for time. I tried this but simply got ¦D and ¦T printed out as text.

After hours of frustration I eventually discovered that the ¦D or ¦T must be accompanied by the EDIT commands to centre, left justify or right justify, or be part of a header or footer definition. Thus the following examples will result in the current date being printed:

```
LJ ¦D
CE ¦D
RJ ¦D
DH //¦D//
DF ///¦D/
```

You cannot simply enter ¦D on a line by itself or within the body of the text. I have added the date entry to my list of function key definitions for View as follows:

```
*KEY11!!$LJ!M!!D!M
```

I defined it for the Copy key so that Shift+Break+Copy in the edit mode of View produces a line with the current date left justified.

● *Next month I will be taking a look at some of the new features of View 3.0 over previous versions, together with the advanced features of the editor.*

AT LAST WHOLESALE PRICES TO YOU THE USER

Below is only a sample of our products and prices please phone or write for your computer requirements.

5¼" Floppy Disks – with Lifetime warranty & certified 100%

SS/DD 48tpi	£8.50 per 10	Price includes FREE Library case
DS/DD 48tpi	£9.95 per 10	
DS/QD 96tpi	£10.70 per 10	

With orders of 50, 70 or 100 discs a FREE lockable disc box instead of library cases. Your option.

5¼" Lockable Disk Boxes

DD-100L	100 Capacity	£11.60
DD- 70L	70 Capacity	£10.00
DD- 50L	50 Capacity	£9.76

3½" Lockable Disk Box

DD- 40L	40 Capacity	£8.50

Listing Paper 11" × 9½" 1PT Plain 60grm Perf Margin

2000 Sheets	£12.50
1000 Sheets	£7.25
500 Sheets	£4.00

Printer Ribbons (Vast range available)

Epson MX/FX/RX 80	£3.25 each	£14.40 for 5
Shinwa CP80/MT 80 M/S	£3.50 each	£14.60 for 5
OKI 80/82/83	£1.50 each	£7.17 for 5
Juki 6100 M/S	£2.30 each	£10.25 for 5
Star 10X-15X	£1.50 each	£7.17 for 5

ALL PRICES INCLUDE VAT AND P&P

The price you see is what you pay. No hidden extras.
Please make cheque & PO payable to:

MCS **Manor Court Supplies Ltd**

80 North Road, Yate, Bristol, Avon BS17 5PR. Tel: 0454 322744
VAT invoice if required. Co. Reg. No. 1730374

DOUBLE PHANTOM?

YES! This IS the program demonstrated on BBC TV's "Micro Live". The Worlds first micro multi-user combat flight simulation is now available direct from DOCTOR SOFT via our 'HOT LINE' FIRST CLASS MAIL ORDER service.

DOUBLE PHANTOM is basically a TWO computer version of the highly acclaimed PHANTOM COMBAT simulation. At least one BBC must have a disc system. A hardware link (included) then links the machines which become separate aircraft sharing the same airspace, each VISIBLE and VULNERABLE to the other!

DOUBLE PHANTOM has all the usual PHANTOM features including the fastest and smoothest 3D colour graphics around (15fps). RAF Phantom pilot Paul Courtnage's verdict: "Marvellous . . . quite the best micro flight simulation I've ever seen . . . Totally captivating!"

Phone: Mail Order Hot line 0903 776000 with VISA/ACCESS. Mail: PO BOX 66, East Preston, West Sussex BN16 2TX. Most orders despatched SAME DAY, FIRST CLASS, POST FREE.

DOUBLE PHANTOM (inc link)	BBC ★	disc	19.95
LINK separately	BBC	cable	9.95
PHANTOM COMBAT	BBC ★	disc	12.95
PHANTOM COMBAT	Electron & BBC	cass	9.95
747	BBC B only	disc	9.95
747	BBC B only	cass	8.95
747	Electron	cass	7.95
747	Commodore 64	cass	12.95
747	Commodore 64	disc	14.95
747	Commodore 64(USA format)	disc	14.95

(Overseas orders, equiv currency, add air mail at cost)
JOYSTICKS optional with all programs
BBC means all machines from 32k up
★ SPECIFY DFS when ordering discs
£2 discount on multiple order

DOCTOR SOFT - THE FLIGHT SIMULATION SPECIALIST

SPEEDYSOFT

01-846 9353 (24 HRS)

ALL ORDERS NORMALLY DESPATCHED THE SAME DAY WE RECEIVE THEM

AMX MOUSE

"A LOVELY LITTLE CREATURE." (Crash!)
"The AMX mouse represents excellent value for money ... the obvious choice for everyone interested in graphics ... what more could you want?" (Popular Computing Weekly 04/86)
BBC/BBC+. 16K ROM + 40/80 Track Disc. £5 off. Only £84.95

GRAPHIC ADVENTURE CREATOR.

WRITE AND SELL YOUR OWN ADVENTURES.
"The most astounding program I've ever encountered on an eight-bit machine ... those who want to write adventures will find there is no better value-for-money product on the market." (Amtix 12/85)
BBC. Cassette £22.95 Disc (State 40 or 80 Track) £27.95

1986 HACKER'S HANDBOOK

"An extremely useful handbook for anyone with a modem who wishes to explore a bit further than the pages of Micronet." (Sinclair User)
New 168-page paperback of 1985 best-seller is expanded and updated.
BBC/BBC+/BBC Master. Paperbook £6.95

IMAGIN.A

"The first piece of graphics software to take full advantage of the extra memory in the Master and BBC+ ... a fast and sophisticated drawing package." (A&B Computing 06/86)
BBC/BBC+/BBC Master. (Ibbotsons) State 40 or 80 Track disc: £57.50

"THE FASTEST SOFTWARE SERVICE IN THE WORLD"
(P. SZETO, WALES)

PHANTOM

"Response to the controls is fabulous ... if you like flying, this game is for you ... the best flight simulation I've seen on the Beeb." (Micro User 03/86)
'Phantom' is a great flight/combat simulator. 'DOUBLE PHANTOM' is the world's first multi-user combat simulation. Each BBC (hardware link supplied for 2) becomes a separate fighter, sharing the same airspace!
BBC/BBC+/BBC Master. (Dr Soft) Cassette £9.95. Disc (State 40 or 80 Track) £12.95. DOUBLE PHANTOM (40/80 track OK) £19.95

THE QUILL

"A superb utility ... it overcomes most of the memory limitations imposed by programming in BASIC and must be an absolute godsend to people who have the imagination, but not the programming ability, for creating adventures." (Computing with Amstrad 11/85)
BBC/BBC+/BBC Master. (Gilsoft) Cassette £16.95 40/80 Track disc £22.95

COMMANDO

"Sticks closely to the arcade game and has great music ... GI Joe is beautifully animated ... totally addictive arcade copy." (C&VG 02/86)
BBC. (Elite) Cassette £9.95 Disc (State 40/80 Track) £14.95

"EXTREMELY FAST AND RELIABLE SERVICE"
(P. TURNBULL, NEW ZEALAND)

FLEET STREET EDITOR

"The supplied graphics, the ease with which layouts can be put together and the ease with which effects can be applied to text, mean that this is a true step-up from the wordprocessor in combination with conventional artwork ... an all-round success." (A&B Computing 03/86)
BBC. (NOT with 6502) (Mirrorsoft) 2 discs (State 40/80 Track) £39.95

MINI OFFICE 2

"It's excellent ... the word processor is literally overflowing with excellent features ... the database is very easy to use yet extremely powerful ... the spreadsheet is the next little gem ... I cannot praise it too highly." (Popular Computing Weekly 03/86)
BBC/BBC+. (Database) Cassette £14.95. Disc (State 40/80 Track) £16.95.

YES CHANCELLOR

RUN THE COUNTRY BETTER THAN THE CHANCELLOR.
This complex simulation comes with threatened strikes, runs on the £, elections, opinion polls. Use the on-screen graphs to help you decide. Survive for 15 years and you'll have earned yourself life peerage!
BBC/BBC+. (Chalksoft) Disc only (State 40/80 Track) £17.50

CITADEL

100-SCREEN ARCADE ADVENTURE
"The ultimate arcade adventure for BBC owners ... impressive full-colour graphics and perfectly smooth scrolling." (Popular Comp: Weekly 04/86)
BBC. (Superior) Cassette £9.95 Disc (State 40/80 Track) £11.95

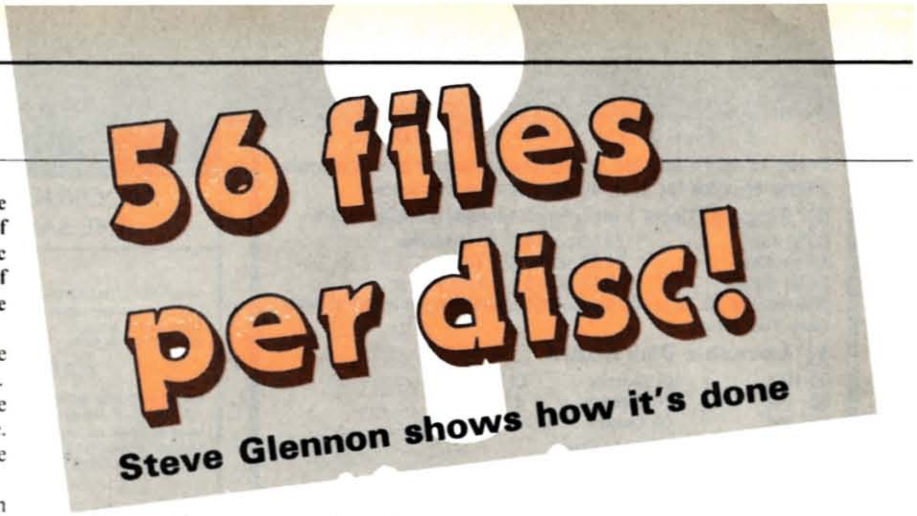
HOW TO ORDER

UK prices include VAT. Export prices are the same, because of the extra work involved. Remember to add postage & packing: UK £1 per order: Europe £1.50 per program: Outside Europe £2.00 per program. Satisfied customers in 64 countries. To order quote reference 'MU15'.
BY PHONE: Call 01-846 9353 at any time, 24 hrs a day. Leave your name, address, phone no;, order, credit card type, expiry date, card number, quote reference 'MU15'.
BY POST: Send your order to SPEEDYSOFT, 37 Church Road, London SW13 9HQ. Make cheque/PO payable to Speedysoft. Don't forget to add p&p. Quote reference 'MU15'. All orders must be prepaid.

ACCESS
VISA
EUROCARD
MASTERCARD

56 files per disc!

Steve Glennon shows how it's done



ONE of the biggest restrictions of the Acorn Disc Filing System is that of limiting you to only 31 files per disc surface. If, like me, you are fond of short, sweet programs, the "Catalogue full" error soon becomes evident.

A full catalogue can often leave one quarter, if not half of a disc unavailable.

There are several solutions to the problem, most involving extra expense. Changing to a different DFS is one approach but is often costly.

Another is to write a utility for eprom or sideways RAM, but again the initial expense of an eprom programmer or of the sideways RAM detracts from the appeal.

The final approach to be considered is that of a DOS where the commands are stored on the disc itself, as is the case with some CP/M systems.

No outlay is required and the only overheads are those of the command files in the catalogue and a small amount of disc space. However as the number of files is to be doubled the space taken up in the catalogue will become almost unnoticed.

We will really need only two commands, one to alternate between the different catalogues and one to catalogue both halves of the disc at once.

The extra catalogue will take up two sectors, and if we can keep the command files short, say less than 256 bytes each, we will lose just 1k of disc space altogether.

In order to implement the utility we must first look at the way the Acorn DFS lays out information in the catalogue, which consists of the first two sectors on the disc, that is track 0, sectors 0 and 1.

Sector 0 contains the information for part of the disc title and the names and directories of all 31 files on a normal disc.

The eight bytes at the beginning of the sector contain the first eight bytes of the disc title, and each successive set of eight bytes contains the seven letters of the filename plus a further byte containing both the directory and the locked status of the file.

This is repeated for all files on the disc up to a maximum of 31 which will use $8+31\times8=256$ bytes, the whole of sector 0. The locked status is kept in the most significant bit of the directory byte.

Sector 1 contains the remaining bytes of the disc title, some general information about the disc, load and execute addresses, length and start sector of each file of the disc. The first four bytes of the sector contain the last four bytes of the disc title.

The fifth byte contains the number of times the disc has been written to. This is the number shown in the brackets after the disc title when a *CAT is performed.

The sixth byte contains the number of files on this side of the disc, multiplied by 8.

The seventh byte contains the boot up option as set by *OPT4,n in bits 5 and 4, and the two most significant bits of the number of sectors on the disc in bits 1 and 0. Bits 7,6,3 and 2 are not used.

The eighth byte contains the eight least significant bits of the number of sectors. (The maximum possible number of sectors is a ten bit number.) Following these eight bytes are sets of eight bytes corresponding to those in sector 0, but containing the file info for each file – more on those later.

In the catalogue covering the first half of the disc we can alter bytes 7 and 8 to halve the number of sectors on the disc. This will prevent the DFS "seeing" the inner half of the disc, and effectively it will be write protected.

We will also need a dummy file to stop the DFS' overwriting the second catalogue when it saves further files.

In the second catalogue we add a dummy file covering the first half of the disc to protect the information there and to make the DFS save any further files from track 20 (on a 40 track disc) or track 40 (on an 80 track disc). The full number of sectors on the disc is required in this catalogue.

The two command files in sectors 2 and 3 of track 0 are accessible to both catalogues and so a second copy of them is not required in the second half of the disc.

The two commands to be implemented are *SWAP and *XCAT, the first loading the two catalogues from track 0 sectors 0, 1 and track 0 sectors 4, 5 into memory and then saving them into the opposite area.

This is carried out using the OSWORD command with the accumulator containing &7F, which is specific to the DFS and can be used to perform various functions including the loading and saving of sectors. The command *XCAT catalogues both halves of the disc by:

- Issuing a *CAT command.
- Issuing a *SWAP command.
- Issuing another *CAT command to print out the new catalogue.
- Issuing *SWAP to return the disc to its original state.

As the files are *RUN they must be in machine code, which has the added advantages of being fast and that it does not use much memory, and therefore disc space.

The dummy file must be created in the catalogue in order to stop various parts of the disc being overwritten.

To create the dummy entry we need to consider the file information stored in sector 1 of the catalogue. The information for each file is stored in eight bytes and consists of:

LOAD address (18 bits)
Execute address (18 bits)
Length (18 bits)
Start sector (10 bits)

They are stored in the following order:

2 bytes – load address, 16 least significant bits.
2 bytes – execute address, 16 least significant bits.
2 bytes – length, 16 least significant bits.
1 byte – 2 most significant bits of each of the above and 2 most significant bits of start sector in the order.
bits 7,6 Execute address
bits 5,4 Length
bits 3,2 Load address
bits 1,0 Start sector
1 byte – 8 least significant bits of start sector.

In the catalogue for the first half of the disc the dummy file is 512 bytes long and starts at sector 4, corresponding to the alternative catalogue.

In the second catalogue the dummy file has a length of half the disc capacity, less 1k since it starts at sector 4, leaving 1k of disc space before it, and extends halfway across the disc.

Files are stored in the catalogue in reverse order, that is the first file on the disc is the last entry in the catalogue, so in each catalogue *dummy* is the first entry, *xcat* is the second and *swap* is the third. The sets of eight bytes of file information are stored in the same order as the filenames.

The program to produce the dual catalogue disc is shown in Listing I. It prompts for the number of tracks on the disc and the drive which is to be split.

The program then checks whether the disc is already split by checking whether the number of sectors on the disc tallies with the number of tracks entered earlier.

It also checks if the files *swap* or *dummy* exist, and if any of the above indicators of the disc being split already exist, the program aborts.

The number of files on the disc is also checked, and if any exist the program stops since it can only deal with a formatted, but otherwise empty disc.

When all the above safeguards have been performed the disc is split by producing the two catalogues and saving them using OSWORD &7F. The two commands are then assembled and saved to disc, this time using *SAVE.

After running the program the number of available files is effectively increased from 31 to 56. Not 62, as three files are entered in each catalogue. Disc space has only been decreased by four sectors (1k), though – a fair exchange! More of the disc is now available for storage, especially where many short files are saved on one disc.

The catalogues may be interchanged by simply entering *SWAP, and both catalogues may be shown by entering *XCAT.

As the program stands, both commands execute with the read/write head stationary over track 0.

If the dual catalogue disc is write-protected the alternative catalogue can't be written to the disc on sectors 0 and 1, so disabling the two commands.

If either is tried on a write-protected disc the error message "Swap error" is given.

The only other limitation is that the two commands should not be used when files are open as they use pages &12 to &15 for the swapping of the catalogues and *XCAT executes in page &16.

If a disc is to be backed up using *BACKUP, the current catalogue must be that covering the second half of the disc. To find out which catalogue you are in type *INFO $.DUMMY. The length of the program will be either &0200 or greater than &6C00 (&18C00 for an 80 track disc).

The larger value indicates that you are in the catalogue covering the second half of the disc. I find it useful to put 1 and 2 in the titles of the two catalogues to keep track.

Full listing starts on Page 98

PROGRAM STRUCTURE

70-140	Main program which calls several procedures.
160-240	Define variables.
260-350	Find out whether 40 or 80 track drives.
370-440	Find out which drive to split.
460-480	Load old catalogue.
490-540	Check number of sectors, check for dummy, swap and ends if any wrong.
550-590	Check to make sure no files, if there are, end.
620-690	Set up OSWORD parameter block to load two sectors in the order drive number, buffer address, number of params to follow, 8271 command, track, sector, sector size/number of sectors.
700-710	Set up A%,X%,Y% and call OSWORD.
720	Checks if disc error has occurred.
750-820	Set up parameter block to save two sectors.
830-850	Set up A%,X%,Y%, call OSWORD and check for disc error.
880-920	Set up A%,X%,Y% for OSWORD.
940-990	Check catalogue for $.swap.
1020-1070	Routine to get name from catalogue.
1090-1110	Get number of sectors on disc from catalogue.
1130-1190	Check for $.dummy in catalogue.
1210-1230	Get number of files from catalogue.
1250-1270	Print out "Already Split" message.
1290-1350	Save new files in correct order to set up new catalogue.
1370-1520	Load catalogue, alter it and save to disc.
1560-1660	Set up sector 0 of alternative catalogue.
1680-2050	Set up sector 1 of alternative catalogue with file information for dummy, XCAT, SWAP.
2060-2110	Save alternative catalogue to track 0 sectors 4 and 5 and restore first catalogue in &0E00-&0FFF.
2130-2230	Assemble and save the two command files.
2280-2410	Start of swap, get current drive using OSGBPB, store in drive number.
2430-2460	Set up X=Sector number, Y=Track number, A=Store page number load two sectors.
2480-2610	Repeat load as for 2430-2460 and save in similar manner.
2630-2670	Restore catalogue to &0E00-&0FFF.
2680	End of swap routine.
2700-2750	Start parameter block set up for OSWORD read sectors.
2770-2810	Start parameter block set up for OSWORD write sectors.
2830-2970	Set up rest of parameter block and call OSWORD.
2980-3000	Check for disc errors.
3020-3050	Error message "Swap error".
3070-3110	Set up A,X,Y and call OSWORD.
3130-3140	Storage places for drive number and block.
3180-3240	Send *DRIVE drive via OSCLI.
3260-3350	Assembly of XCAT doing *CAT, *SWAP, *CAT, *SWAP.
3370-3420	Sends */SWAP via OSFSC.
3440-3460	SWAP string.
3480-3490	Do *CAT via OSFSC.
3550	Return character for CAT drive number parameter.
3600-3640	Disc error routine.
3660-3740	Basic I patches for EQUB and EQUS.

From Page 97

```
   10 REM SPLIT CATALOGUE DISC
   20 REM PRODUCING PROGRAM
   30 REM REQUIRES ORDINARY
   40 REM FORMATTED DISC
   50 REM (C) The Micro User
   60
   70 MODE7
   80 PROCinit
   90 PROCfortyeighty
  100 PROCwhichdrive
  110 PROCcheckdisc
  120 PROCsplit
  130 PROCsaveswap
  140 END
  150
  160 DEF PROCinit
  170 OSWORD=&FFF1
  180 OSGBPB=&FFD1
  190 oscli=&FFF7
  200 DIM paramblock 13
  210 catplace%=&0E00
  220 sector0=&0E00
  230 sector1=&0F00
  240 ENDPROC
  250
  260 DEF PROCfortyeighty
  270 REPEAT
  280 PRINTTAB(0,10)"Forty or Eighty
Track Drive? (F/E) ";
  290 G$=INKEY$(100)
  300 G$=CHR$(ASC(G$)AND&4F)
  310 UNTIL G$="F" OR G$="E"
  320 PRINT G$
  330 totaltracks=80
  340 IF G$="F" totaltracks=40
  350 ENDPROC
  360
  370 DEF PROCwhichdrive
  380 REPEAT
  390 PRINTTAB(0,12)"Which Drive do y
ou wish to split? (0-3)"
  400 drive=GET
  410 drive=drive-48
  420 UNTIL drive<4 AND drive>=0
  430 PRINTTAB(5,16)"Splitting Drive
";drive
  440 ENDPROC
  450
  460 DEF PROCcheckdisc
  470 track%=0:sector%=0
  480 PROCloadcat
  490 PROCcheckforswap
  500 IF split<>0 THEN PROCalreadyspl
it:END
  510 PROCchecknsectors
  520 IF nsectors/totaltracks<10 THEN
 PROCalreadysplit:END
  530 PROCcheckfordummy
  540 IF dummy<>0 THEN PROCalreadyspl
it:END
  550 PROCchecknfiles
  560 IF nfiles=0 ENDPROC
  570 CLS
  580 PRINT"This disc already contain
s files!"
  590 END
  600 ENDPROC
  610
  620 DEF PROCloadcat
  630 ?paramblock=drive
  640 paramblock!1=catplace%
  650 paramblock?5=3
  660 paramblock?6=&53
  670 paramblock?7=track%
  680 paramblock?8=sector%
  690 paramblock?9=&22
  700 PROCaxy
  710 CALL OSWORD
  720 IF paramblock?&A<>0 THEN PROCer
ror
  730 ENDPROC
  740
  750 DEF PROCsavecat
  760 ?paramblock=drive
  770 paramblock!1=catplace%
  780 paramblock?5=3
  790 paramblock?6=&4B
  800 paramblock?7=track%
  810 paramblock?8=sector%
  820 paramblock?9=&22
  830 PROCaxy
  840 CALL OSWORD
  850 IF paramblock?&A<>0 THEN PROCer
ror
  860 ENDPROC
  870
  880 DEF PROCaxy
  890 A%=&7F
  900 X%=paramblock MOD256
  910 Y%=paramblock DIV256
  920 ENDPROC
  930
  940 DEF PROCcheckforswap
  950 split=0
  960 FOR dir=sector0+&08 TO sector0+
&F8 STEP &08
  970 IF CHR$((dir?7)AND &7F)="$" THE
N PROCname ELSE GOTO 990
  980 IF NAME$="swap   " THEN split=1
  990 NEXT
 1000 ENDPROC
 1010
 1020 DEF PROCname
 1030 NAME$=""
 1040 FOR A=0 TO 6
 1050 NAME$=NAME$+CHR$(dir?A)
 1060 NEXT
 1070 ENDPROC
 1080
 1090 DEF PROCchecknsectors
 1100 nsectors=256*((sector1?6)AND3)+
(sector1?7)
 1110 ENDPROC
 1120
 1130 DEF PROCcheckfordummy
 1140 dummy=0
 1150 FOR dir=sector0+&08 TO sector0+
&F8 STEP &08
 1160 IF CHR$((dir?7)AND &7F)="$" THE
N PROCname ELSE GOTO 1180
 1170 IF NAME$="dummy  " THEN dummy=1

 1180 NEXT
 1190 ENDPROC
 1200
 1210 DEF PROCchecknfiles
 1220 nfiles=(sector1?5)DIV8
 1230 ENDPROC
 1240
 1250 DEF PROCalreadysplit
 1260 CLS:PRINTTAB(0,10)"DISC ALREADY
 SPLIT!"
 1270 ENDPROC
 1280
 1290 DEF PROCsplit
 1300 PROCchange_drive
 1310
 1320 REM SET UP FILES IN CATALOGUE
 1330 *SAVE"swap   "FF0A00 +100 FF0A0
0
 1340 *SAVE"xcat   "FF1600 +100 FF0A0
0
 1350 *SAVE"dummy  "0000 +200 0000
 1360 track%=0:sector%=0
 1370 PROCloadcat
 1380
 1390 REM ALTER OLD CATALOGUE
 1400 REM AND PUT IT BACK
 1410 REM PUT dummy IN DIR $ AND LOCK
ED
 1420 sector0?&0F=&A4
 1430
 1440 REM DISC INFO
 1450 sector1?5=3*8
 1460 newsectors=totaltracks*5
 1470 sector1?7=newsectors AND &FF
 1480 hnsects=sector1?6
 1490 hnsects=hnsects AND &FC
 1500 hnsects=hnsects OR(newsectors D
IV256)
 1510 sector1?6=hnsects
 1520 PROCsavecat
 1530
 1540 REM NOW SET UP NEW CATALOGUE
 1550
 1560 !sector0=0
 1570 sector0!4=0
 1580 $(sector0+8)="dummy  "
 1590 sector0?&0F=&A4
 1600 $(sector0+&10)="xcat   "
 1610 sector0?&17=&A4
 1620 $(sector0+&18)="swap   "
 1630 sector0?&1F=&A4
 1640 FORX=sector0+&20 TO sector0+&FF
 1650 ?X=0
 1660 NEXT
 1670
 1680 REM DISC INFO
 1690 !sector1=0
 1700 sector1?4=0
 1710 sector1?5=3*8
 1720 newsectors=totaltracks*10
 1730 hnsects=newsectors DIV256
 1740 sector1?6=hnsects
 1750 sector1?7=newsectors AND &FF
 1760
 1770 REM FILE INFO FOR "dummy","xcat
","swap"
 1780 sector1!&08=0
 1790 dumlength=totaltracks*5-4
 1800 sector1?&0C=0
 1810 sector1?&0D=dumlength AND&FF
 1820 sector1?&0E=(dumlength DIV256)*
16
 1830 sector1?&0F=4
 1840
 1850 sector1?&10=0
 1860 sector1?&11=&16
 1870 sector1?&12=0
 1880 sector1?&13=&16
 1890 sector1?&14=0
 1900 sector1?&15=1
 1910 sector1?&16=&CC:REM LOAD,EXECUT
E  ADDRS IN I/O uP
 1920 sector1?&17=3:REM   START SECT
OF XCAT
 1930
 1940 sector1?&18=0
 1950 sector1?&19=&0A
 1960 sector1?&1A=0
 1970 sector1?&1B=&0A
 1980 sector1?&1C=0
 1990 sector1?&1D=1
 2000 sector1?&1E=&CC:REM LOAD,EXECUT
E  ADDRS IN I/O uP
 2010 sector1?&1F=2:REM   START SECT
OF SWAP
 2020
 2030 FORX=sector0+&20 TO sector0+&FF
 2040 ?X=0
 2050 NEXT
 2060 track%=0:sector%=4
 2070 PROCsavecat
 2080 track%=0:sector%=0
 2090 REM RESTORE CATALOGUE
 2100 PROCloadcat
 2110 ENDPROC
 2120
 2130 DEF PROCsaveswap
 2140 FOR PASS=0 TO 2 STEP2
 2150 PROCassemble
 2160 NEXTPASS
 2170 FOR PASS=0 TO 2 STEP2
 2180 PROCasm1
 2190 NEXTPASS
 2200 *SAVE"swap   "FF0A00 +100 FF0A0
0
 2210 *SAVE"xcat   "FF1600 +100 FF160
0
 2220 *ACCESS XCAT L
 2230 *ACCESS SWAP L
 2240
 2250 PRINT"FINISHED"
 2260 ENDPROC
 2270
 2280 DEFPROCassemble
 2290 P%=&0A00
 2300 [OPT PASS
 2310 .begin
 2320
 2330 .getcurdrive
 2340 LDX #block MOD256
 2350 LDY #block DIV256
 2360 LDA #6
 2370 JSR OSGBPB
 2380 LDA block+2
 2390 SEC
 2400 SBC #48
 2410 STA driveno
 2420
 2430 .swap LDX #0   \Sector no.
 2440 LDY #0         \Track no.
 2450 LDA #&12       \Store page no.
 2460 JSR load2sects
 2470
 2480 LDX #4         \Sector no.
 2490 LDY #0         \Track no.
 2500 LDA #&14       \Store page no.
 2510 JSR load2sects
 2520
 2530 LDX #4          \Sector no.
 2540 LDY #0          \Track no.
 2550 LDA #&12        \Source page no
.
 2560 JSR save2sects
 2570
 2580 LDX #0          \Sector no.
 2590 LDY #0          \Track no.
 2600 LDA #&14        \Source page no.
 2610 JSR save2sects
 2620
 2630 .restore_catalogue
 2640 LDX #0
 2650 LDY #0
 2660 LDA #&0E
 2670 JSR load2sects
 2680 RTS              \End of routine
 2690
 2700 .load2sects      \Load routine
 2710 PHA
 2720 LDA #&53         \issue read to
8271
 2730 STA block+6
 2740 PLA              \Restore acc.
 2750 JMP setupblock
 2760
 2770 .save2sects      \save routine
 2780 PHA
 2790 LDA #&4B         \issue write to
 8271
 2800 STA block+6
 2810 PLA              \Restore acc.
 2820
 2830 .setupblock
 2840 STA block+2      \Source or stor
e page no.
 2850 STX block+8      \Sector no.
 2860 STY block+7      \Track no.
 2870 LDA driveno
 2880 STA block        \Drive no.
 2890 LDA #0
 2900 STA block+1
 2910 STA block+3
 2920 STA block+4
 2930 LDA #03
 2940 STA block+5
 2950 LDA #&22         \2 sectors of 2
56 bytes
 2960 STA block+9
 2970 JSR osword       \issue command
 2980 LDA block+&0A    \error code
 2990 BNE discerror
 3000 RTS
 3010
 3020 .discerror BRK
 3030 OPT FNequb(201)
 3040 OPT FNequs("Swap error")
 3050 BRK
 3060
```

From Page 99

```
3070 .osword LDA #&7F
3080 LDX #block MOD256
3090 LDY #block DIV256
3100 JSR OSWORD
3110 RTS
3120
3130 .driveno BRK
3140 .block
3150 ]
3160 ENDPROC
3170
3180 DEF PROCchange_drive
3190 drive=drive+48:REM CHANGE TO AS
CII CHAR
3200 $&C00="DRIVE "
3210 ?&C06=drive
3220 ?&C07=&0D
3230 X%=&00:Y%=&0C:CALL oscli
3240 ENDPROC
3250
3260 DEF PROCasm1
3270 P%=&1600
3280 [OPT PASS
3290
3300 .bothcats
3310 JSR cat               \Do *cat
3320 JSR doswap            \Do *swap
3330 JSR cat               \Do *cat
3340 JSR doswap            \Do *swap
3350 RTS
3360
3370 .doswap
3380 LDA #2               \Do */SWAP vi
a OSFSC
3390 LDX #string1 MOD256
3400 LDY #string1 DIV256
3410 JSR osfsc
3420 RTS
3430
3440 .string1
3450 OPT FNequs("SWAP")
3460 OPT FNequb(13)
3470
3480 .cat
3490 LDA #5
3500 LDX #string MOD256
3510 LDY #string DIV256
3520 .osfsc JMP (&21E)
3530
3540 .string
3550 OPT FNequb(13)
3560
3570 ]
3580 ENDPROC
3590
3600 DEF PROCerror
3610 CLS
3620 PRINT"Disc error No.&";~parambl
ock?&A
3630 END
3640 ENDPROC
3650
3660 DEF FNequb(Z%)
3670 ?P%=Z%
3680 P%=P%+1
3690 =PASS
3700
3710 DEF FNequs(Z$)
3720 $P%=Z$
3730 P%=P%+LEN(Z$)
3740 =PASS
```

This listing is included in this month's cassette tape offer. See order form on Page 141.

Vine Micros

DOES IT MAKE SENSE TO BUY A DISC DRIVE . . .
. . . AND LOAD MOST OF YOUR PROGRAMS FROM TAPE?

In a world where time is money and delay is frustration, the REPLAY System can bring taped software into the disc era.
There is no other way of transferring software to disc that is so effective and efficient as REPLAY. Thousands have now been sold and acclaimed by the users as indispensable.
REPLAY is more than a transfer utility . . .

REPLAY captures the computer's memory and takes it in disc form at virtually any point, whether the original program has been loaded from tape, disc or personal endeavour.

REPLAY can reload a selected screen from disc, ready for printing out to a hard copy.

REPLAY can effect a simple 'pause' or save a partly completed program to disc for later use.

REPLAY is 'encoded' in order that programs transferred to disc are individual to, and can only be run by, the same computer. Get more enjoyment and action out of your software with the REPLAY System.

Easy to fit with no soldering, uses one sideways ROM socket with three simple connections into the computer.

REPLAY must be matched to the DFS in use:
R8271 – Acorn 8271, also S/D Watford and Pace DFS.
R8272 – U.D.M. DFS   R8877 – Cumana QFS.
R1770 – Opus 3.45 DFS and Solidisk Issue 1.
R1770A – Acorn 1770 DFS and ADFS, also Solidisk Issue 2.
R1770B+ – for BBC B+ only. R1770C – Opus Challenger only.
R1770W – Watford DDFS only. R2791 – Opus 3.15 only.
R2793 – Opus 3.35 only.   (Acorn 'Master' in preparation)

Price **£35.00** (incl. VAT), with full instructions for installation and use.
Further details and reviews available.

New Product – "MASTER" write-protect switch

A small module that fits inside the Master Computer enabling you to write-protect the Sideways RAM banks.
Available NOW £8.95

THE MATRIX ROM

The MATRIX ROM is an essential tool for Science and Mathematics Departments in schools, for Science, Computing and Engineering Departments in Universities and Polytechnics, and for anyone who writes serious programs for industrial applications.

WRITTEN WITH THE COOPERATION OF THE CIVIL ENGINEERING DEPT. OF SOUTHAMPTON UNIVERSITY

The MATRIX ROM provides a comprehensive range of commands for performing matrix operations (including inversion). One of the many commands will solve a set of linear simultaneous equations, and another deals with sets of banded symmetrical equations. In addition there are commands for deleting and redimensioning arrays (to re-use valuable memory space), for finding maximum and minimum values in any row or column, and for inputting, saving, loading and printing arrays. All commands are executed in machine code much more quickly than is possible in BASIC. Many lines of coding can be eliminated and much memory space can be saved.

These facilities transform the capability of the BBC Micro when dealing with tasks such as graphical transformations in two or three dimensions, or structural analysis, electrical circuits or vibration problems. In fact any problem where matrix operations or linear simultaneous equations are involved. The power of FORTRAN can now be combined with the simplicity of BASIC and the excellent graphics of the BBC micro.

Suitable for the BBC 'B', 'B+' and ELECTRON computers.
£36.00 (plus VAT), includes comprehensive Manual.
Quantity discount offered to Educational Establishments.
Further details available on request.

For further details or supply contact:
VINE MICROS, MARSHBOROUGH, NR. SANDWICH,
KENT CT13 0PG. (Tel: 0304 812276)
Or through your local Dealer.

BARCLAYCARD VISA

Patch in View to the printer of your choice

PETE SMITH describes a printer driver generator for View

A PRINTER driver is a software patch which allows a program such as the View word processor to make use of the various facilities offered by different types of printer – underlining, proportional spacing, italics and so on.

These are switched on and off by sending a control code, usually CHR$(27), followed by one or more characters – none of which are printed – which define the command.

Printing resumes at the next character following the command sequence but including the additional effect that was programmed. It is the printer driver's job to send an appropriate sequence of characters to a printer every time a particular feature is requested.

Life would be easy if every type of printer responded to the same control codes in the same way, but as they don't the driver has to be tailored to a particular make or model of printer. However when changing printers it is only necessary to change drivers, and not the whole word processor to retain compatibility.

The authors of View built into their word processor the facility of being able to use a printer driver. Special printer commands are addressed to the driver and incorporated into the text as highlight characters typed in using the two function keys defined for that purpose.

When the text is printed, all characters including the highlights are sent to the printer driver first. The driver traps the highlights and replaces them with commands that the printer will respond to.

This means that a feature such as underlining can be programmed into the text with a single character whereas the printer command that will eventually be transmitted is usually several characters long.

Viewgen is a Basic program which can generate a View compatible driver for most printers used with the BBC Micro. This is achieved by editing the data statements at the end of the program and then running it.

Type in the program exactly as given, taking particular care to get the conditional statements right. Also be sure to get all the labels in the assembler section typed in correctly – some are array elements.

When you come to the data statements note that they are all structured in the same way – a header string followed by numeric data and a terminator (&FF). The latter is used to tell the generator program that it has come to the end of a sequence. Neither the string data nor the terminators are included in the driver when it is assembled.

The first data statement should contain the filename you wish to assign to the assembled driver followed by the number of pairs of enable/disable commands to be assembled (and &FF).

The commands are grouped in pairs since they are switched on and off by the same highlight code. The first pair will be activated by sending highlight code 128 to the driver, the next pair by 129, and so on.

However, the next set of data, print pound, is not counted in this total. Pound trapping is included since the pound sign is not a standard Ascii code, though it can usually be printed somehow. If you do not wish to take advantage of pound trapping type in 96 – the Ascii code for the BBC pound sign – instead:

```
DATA Pound sign,96,&FF
REM No pound trapping
```

Otherwise type in the relevant command bytes, for example for a Juki 6100:

```
DATA Print pound,27,73,&FF
REM Pound trapping
```

When using the driver, if an out-of-range control code is sent – that is higher than the last highlight code number assigned when the driver was generated – this is trapped and ignored, but in addition pound sign trapping is disabled.

This allows the normal Ascii character 96 – the grave accent – to be printed. A second out-of-range highlight code will turn on pound sign trapping again.

The sample commands given in the listing apply to the Epson RX80 printer. For a different machine it will be necessary to refer to the instruction manual to determine the code sequences to be built into your driver. Each command will probably begin with the character ESC (Ascii 27) and will be followed by one or more Ascii codes.

For example, on the Epson RX80 bold print – double strike – is achieved by the command ESC, G – enable, or ESC, H – disable. To enter this into the generator program you have to type in the following:

```
DATA Bold print,27,71,&FF
DATA Cancel bold,27,72,&FF
```

where ESC is represented by 27 and the Ascii codes for G and H are 71 and 72 respectively. The numeric data may be entered as decimal or hexadecimal, but remember to include the preceding & to indicate hex if you use that format.

Certain commands have no logical disable, for example changing pitch on a daisywheel printer. In this case the disable command could be a default

→

From Page 101

state – say, 12 pitch.

However if you wish to leave a command permanently enabled when it is invoked omit all the numeric data from the disable sequence. You must still enter a header string and terminator, but put nothing in between. Thus for the Juki 6100 a typical sequence might read:

```
DATA 15 pitch,27,31,9,&FF: REM enable
DATA None,&FF: REM no disable
```

You should be able to fit about 16 pairs of two and three byte commands into the available space, together with a short print pound sequence. The highlight keys in View can be programmed to produce any value, so you are not restricted to just two commands.

However the values generated should all be greater than 127 to be recognised by the driver. You should refer to the View instruction manuals to see exactly how to program the highlight keys.

Each command can have any number of characters, but the space reserved by View for the driver is limited to 256 bytes. The length of the driver is checked after assembly to make sure that this figure is not exceeded.

When the program is run the printer driver is assembled from the source code and the printer control codes held in the data statements are poked into memory with it.

Every time the terminator byte &FF is encountered 128 is added to the previous data byte to signal end of data to the driver. The driver automatically subtracts these values before it transmits the characters to the printer.

During assembly hard copy of the data may be obtained including the relevant View highlight code for ease of checking and for reference. Which code number a highlight command will respond to depends on the order you typed in the commands.

After assembly the driver and appended data are automatically saved to disc or tape and can be loaded into memory from View command mode by typing:

```
PRINTER NAME
```

where NAME is the filename of the driver you have created. Don't worry about the file arguments – View specifies the load address when you issue the PRINTER command.

Since the driver is meant to run at &400, an area reserved by the Basic ROM, it is assembled in the user RAM area. As a result all absolute addresses within the driver have to be adjusted before it will work.

Users of Basic II may use the extended OPT command, but I have made it possible for the program to run on Basic I machines as well by labelling all the relevant assembler statements with elements of the array *b* and then adjusting the addresses using PROCbasic1 after assembly.

The first five instructions of the driver must be jumps pointing to the various routines it will be expected to perform. These are print a character, enable the printer (equivalent to VDU2), disable the printer (VDU3), and set and report on microspacing.

The last two facilities are not implemented here and the JMPs point straight to an RTS instruction, causing View to issue a warning if you attempt to select microspacing.

During printing View enters the driver at the first JMP instruction with the next character for printing in the accumulator. The driver first checks whether it is a control code or a pound character, and if it is neither sends it to the printer and exits via an RTS instruction.

If the pound character is recognised the print pound sequence is sent. If the character to be printed is a highlight code the driver will recognise it because it is a number greater than 127 – the maximum value of an Ascii character.

After trapping a highlight code the next step is to work out which printer command has been requested. The method I have adopted is to use a look-up table which holds, not the printer commands themselves, but their addresses in memory, like the index to a book.

Each command consists of two parts, enable and disable, so the index table will have to be twice as long as the number of commands. Pointers within this table are calculated from the highlight code itself by subtracting 128 from its value and multiplying the remainder by two, giving values 0, 2, 4 and so on. This gives offsets to the enable command addresses, counting from the start address of the index table. The disable address offsets can be determined by adding one to the above, that is 1, 3, 5 and so on.

Once the address of the start of a command has been loaded from the index table the data it points to is sent to the printer a byte at a time until bit 7 of one of the bytes is set (the terminator).

This quite powerful feature of the driver means that a command can have many bytes or just one. Thus several printer commands can be linked and turned on and off by a single highlight code.

For example, you might wish to title a letter using italic, underlined, enlarged, emphasised type on an Epson RX80 printer. This could be done by defining highlight 129 in the generator program with the following data:

```
DATA Titling,27,52,27,45,1,27,87,1,27
,69,&FF
DATA Cancel,27,53,27,45,0,27,87,0,27,
70,&FF
```

All of the enable characters would be sent to the printer if the driver trapped code 129 once, and all the disable characters would be sent if the same code was trapped a second time.

This is possible due to another useful function of the index table which indicates whether or not a command is active by toggling bit 7 of an enable command address in the index table every time that command is processed. This causes enable and disable sequences to be sent alternately.

If no disable sequence was given for a command when the driver was assembled both enable and disable offsets point to the same place, that is the same command is sent to the printer repeatedly. All flags are rest to zero when a printer on command is processed.

The generator program and the drivers it produces are all compatible with Basic I, Basic II and the Tube. The driver will not work with printers which require control codes greater than 127.

```
   10 REM VIEWGEN
   20 REM by P.R.Smith
   30 REM (c) The Micro User
   40 REM Printer Driver Generator
   50 REM for VIEW
   60 :
   70 MODE7
   80 poundata=0
   90 osasci=&FFE3
  100 oswrch=&FFEE
  110 oscli=&FFF7
  120 @%=4
  130 RESTORE 1860
  140 READ file$,n%,d%
  150 DIM driver% 300,par% 30,index(2
*n%),b(13)
  160 limit=2*n%
  170 PRINT'"Hardcopy? y/n ";:y$=GET$
  180 IF INSTR("Yy",y$)<>0 VDU2
  190 PRINT'"VIEW Printer driver gene
rator"
  200 PRINT'"Filename: ";file$
  210 PROCassm
  220 data%=P%+2*n%
  230 PROCpokedata
  240 IF end%-driver%>256 PRINT'"No r
oom for all the data!":END
  250 PROCbasic1
  260 PRINT'"Press Space Bar to save'

  270 REPEATUNTILGET=32
  280 PROCsave
  290 PRINT'"Driver created & stored"
  300 END
  310 :
  320 DEFPROCpokedata
  330 REM
  340 REM Create data table
  350 REM Data stored sequentially
  360 REM Last character in each comm
and has bit 7 set automatically.
  370 REM
  380 ?(pound+5)=data%-P%
  390 PRINT'" VIEW"TAB(7)"HIGHLIGHT"T
AB(29)"COMMAND"TAB(1)"CODE"TAB(7)"COM
MAND"TAB(29)"CHARACTERS"'
  400 READ d$
  410 PRINT" ***"TAB(7);d$;TAB(27);
  420 FOR I%=0 TO n%-1
  430 index(2*I%)=FNpoke
  440 IF same=TRUE index(2*I%-1)=inde
x(2*I%-2)
  450 READ d$
  460 PRINT128+I%;TAB(7)d$;TAB(27);
  470 index(2*I%+1)=FNpoke
  480 READ d$
  490 PRINTTAB(7)d$;TAB(27);
  500 NEXTI%
  510 end%=FNpoke+base
  520 IF same=TRUE index(2*I%-1)=inde
x(2*I%-2)
  530 VDU13,3
  540 REM
  550 REM Create index table containi
ng
  560 REM offsets to first chr. of ea
ch command
  570 REM
  580 FOR I%=0 TO n%-1
  590 P%?(2*I%)=index(2*I%)
  600 P%?(2*I%+1)=index(2*I%+1)
  610 NEXTI%
  620 ENDPROC
  630 :
  640 DEFFNpoke
  650 REM
  660 REM Poke data,
  670 REM update data pointer,
  680 REM calculate offset for index
table
  690 REM
  700 start%=data%
  710 REPEAT READ d%
  720 IF d%<>255 ?data%=d%:data%=data
%+1:PRINTd%;
  730 UNTIL d%=255
  740 PRINT
  750 IF data%>start% ?(data%-1)=?(da
ta%-1)+128:same=FALSE ELSE same=TRUE
  760 =data%-P%
  770 :
  780 DEFPROCbasic1
  790 REM
  800 REM Adjust all absolute address
es within driver to run at &400
  810 REM
  820 FOR I%=0 TO 13
  830 get%=!(b(I%)+1)
  840 addr%=(get% AND &FFFF)-diff%
  850 !(b(I%)+1)=(get% AND &FFFF0000)
+addr%
  860 NEXTI%
  870 ENDPROC
  880 :
  890 DEFPROCsave
  900 REM
  910 REM Save driver
  920 REM
  930 file$="S."+file$+" "+STR$~drive
r%+" "+STR$~end%+" 0 0"
  940 X%=par%:Y%=X% DIV 256
  950 $par%=file$
  960 CALLoscli
  970 ENDPROC
  980 :
  990 DEFPROCassm
 1000 REM Driver source code
 1010 FOR opt%=0 TO 2 STEP 2
 1020 P%=driver%
 1030 diff%=driver%-&400
 1040 [OPTopt%
 1050 .b(0) JMP printtext \ Main entr
y
 1060 .b(1) JMP vdu2      \ points.
 1070 .b(2) JMP vdu3
 1080 .b(3) JMP muspace
 1090 .b(4) JMP reply
 1100 .printtext PHP      \ Preserve
registers
 1110 PHA
 1120 TXA
 1130 PHA
 1140 TSX                 \ Copy accu
mulator
 1150 LDA &102,X          \ from stac
k
 1160 BPL printer         \ Print if
not a highlight...
 1170 ASL A               \ ...If it
is calculate index address
 1180 CMP #limit          \ Address o
ut of range?
 1190 BCC continue        \ Continue
if not
 1200 .b(5) LDA pound+1   \ Else disa
ble
 1210 EOR #&80            \ pound
 1220 .b(6) STA pound+1   \ trapping
 1230 BNE out             \ and exit
 1240 .continue
 1250 TAX                 \ Get offse
t
 1260 .b(7) LDA base,X    \ to printe
r commands
 1270 PHA
 1280 EOR #&80            \ Toggle co
mmand active flag
 1290 .b(8) STA base,X
 1300 PLA
 1310 BMI cancel          \ Branch if
flag already set
 1320 .return TAX
 1330 .transmit LDA #1    \ Send code
s to
 1340 JSR oswrch          \ printer o
nly,
 1350 .b(9) LDA base,X    \ prefaced
by VDU1
 1360 PHA                 \ Preserve
```

→

From Page 103

```
end of command status
 1370 AND #&7F             \ Set bit 7
 to zero
 1380 JSR oswrch           \ Send comm
and character to printer
 1390 INX                  \ Increment
 pointer
 1400 PLA                  \ Recover s
tatus
 1410 BPL transmit         \ Continue
until...
 1420 BMI out              \ ... end o
f command detected
 1430 .b(10)
 1440 .cancel LDA base+1,X \ Get offs
et to
 1450 BNE return            \ cancel c
ommand
 1460 .vdu3 LDA #3          \ Disable
printer
 1470 JMP oswrch
 1480 .printer
 1490 .pound CMP #96       \ Pound si
gn?
 1500 BNE send
 1510 LDX #poundata        \ If so...
 1520 BCS transmit         \ ... send
 command
 1530 .send JSR osasci     \ Print ch
aracter
 1540 .out PLA             \ Restore
 1550 TAX                  \ all
 1560 PLA                  \ the
 1570 PLP                  \ register
s
 1580 .muspace
 1590 .reply RTS           \ Exit
 1600 .vdu2
 1610 LDA #96              \ Restore
 1620 .b(11) STA pound+1   \ pound tr
apping
 1630 LDX #0               \ Reset fl
ags...
 1640 .reset LDA #&7F
 1650 .b(12) AND base,X
 1660 .b(13) STA base,X
 1670 INX
 1680 INX
 1690 CPX #limit
 1700 BCC reset            \ ... unti
l end of index
 1710 LDA #2               \ Enable p
rinter
 1720 JMP oswrch
 1730 .base                \ Start of
 data
 1740 ]
 1750 NEXTopt%
 1760 ENDPROC
 1770 :
 1780 REM Start of data.
 1790 REM Each set of data consists o
f
 1800 REM a header string plus numeri
c
 1810 REM data with &FF as a terminat
or.
 1820 :
 1830 REM Enter driver filename
 1840 REM and number of pairs of
 1850 REM set/cancel commands.
 1860 :
 1870 DATA RX80,15,&FF
 1880 :
 1890 REM Enter print pound sequences
 1900 REM Use &FF as terminator.
 1910 :
 1920 DATA Print pound,27,82,3,35,27,
82,0,&FF
 1930 :
 1940 REM Set/Cancel commands follow.
 1950 REM All commands
 1960 REM terminated by &FF.
 1970 :
 1980 DATA Set Underline,27,45,1,&FF
 1990 DATA Cancel underline,27,45,0,&
FF
 2000 DATA Set bold,27,71,&FF
 2010 DATA Cancel bold,27,72,&FF
 2020 DATA Set emphasised,27,69,&FF
 2030 DATA Cancel emphasised,27,70,&F
F
 2040 DATA Elite type,27,77,&FF
 2050 DATA Back to pica size,27,80,&F
F
 2060 DATA Enlarged type,27,87,1,&FF
 2070 DATA Normal type,27,87,0,&FF
 2080 DATA Condensed,15,&FF
 2090 DATA Cancel condensed,18,&FF
 2100 DATA Superscript,27,83,0,&FF
 2110 DATA Cancel superscr,27,84,&FF
 2120 DATA Subscript,27,83,1,&FF
 2130 DATA Cancel subscr,27,84,&FF
 2140 DATA Italic,27,52,&FF
 2150 DATA Normal,27,53,&FF
 2160 DATA US char. set,27,82,0,&FF
 2170 DATA None,&FF
 2180 DATA English char. set,27,82,3,
&FF
 2190 DATA None,&FF
 2200 DATA Banner type: enlarged+emph
asised,14,27,69,&FF
 2210 DATA Cancel banner,20,27,70,&FF
 2220 DATA Titling 1: italic+underlin
e+enlarge+emphasised,27,52,27,45,1,27
,87,1,27,69,&FF
 2230 DATA Cancel titling,27,53,27,45
,0,27,87,0,27,70,&FF
 2240 DATA Titling 2: italic+enlarged
,27,52,27,87,1,&FF
 2250 DATA Cancel titling 2,27,53,27,
87,0,&FF
 2260 DATA Initialise with US chrs.+p
ica+no skip over,27,64,27,82,0,27,80,
27,79,&FF
 2270 DATA None,&FF
```

This listing is included in this month's cassette tape offer. See order form on Page 141.

PROBLEM

I HAVE some questions regarding copy protection. On some discs if you try to make a backup using one of the numerous copy discs on the market it appears to transfer OK yet when you try to boot the backup disc you get a full screen message usually in colour sometimes flashing or animated.

How is this done? – John Dowden, Canberra, Australia.

SOLVED

I AM afraid that by telling you how to protect software I would also be telling you how to remove the protection.

However look at the disc filing system and see how it is organised. Look at the instructions provided by the disc controller and see what the computer's filing system does.

Then you will be in a position to be able to make changes to this procedure which will render the system useless.

For example, try altering the sector length as described in the February 1986 Micro User.

PRINTERLAND

ORDERED TODAY DELIVERED TOMORROW

UK's LOWEST PRINTER PRICES

GOVERNMENT AND OFFICIAL OVERSEAS ORDERS WELCOME

Free.. WITH ALL PRINTERS BBC USERS PRINTERS GUIDE

KAGA TAXAN KP810 - PLEASE RING FOR UNBEATABLE PRICE.

DOT MATRIX PLUS NEAR LETTER QUALITY	Ex VAT	Inc VAT
SHINWA CP A80 + NLQ	£165.00	£189.75
EPSON LX 80	£190.00	£224.25
CANON 1080A	£219.00	£251.85
JUKI 5510	£209.00	£240.35
CANON 1156	£335.00	£385.25
EPSON FX 85 +	£360.00	£414.00
EPSON FX 105 +	£455.00	£523.25
EPSON LQ 800	£515.00	£592.25
EPSON LQ 1000	£546.00	£627.90
EPSON LQ 1500	£715.00	£822.25
DAISY WHEEL		
QUENDATA 1120	£225.00	£258.75
EPSON DX100 - SPECIAL OFFER	£356.00	£409.40
COLOUR PRINTERS		
EPSON JX-80 - SPECIAL OFFER	£450.00	£517.50
PRINTER TYPEWRITER COMBINED		
JUKI 2200	£245.00	£281.75
MONITORS		
PHILIPS 7502 GREEN	£75.00	£86.25

NOW ONLY 3 MINUTES FROM JUNCTION 23 M62 (MANCHESTER 25 MINUTES LEEDS 20 MINUTES) N.B. From East use Junction 24

156 LONGWOOD GATE
LONGWOOD
HUDDERSFIELD
TEL:
0484 646048/9

Goto Computers

10 Old Crown, Windsor Road, Slough, Berks SL1 2DL
☎ Telephone Orders: Slough (0753) 34191

MASTER CLASS

IT'S NOT ONLY THE PRICE THAT'S GOOD

	£
ACORN MASTER CLASS 128	434
MASTER ECONET TERMINAL	347
Turbo Upgrade	86
512 Upgrade	434
SC Upgrade	956
MONITORS	
Microvitec 1451 Med. Res	229
Microvitec 1451 AP RGB + PAL	269
Taxan KX1202G Hi-Res green	105
Taxan KX1203A Hi-Res ambger	105
Taxan Vision 2 Hi-Res RGB	225
Taxan Vision 3 Hi-Res RGB	335
Philips BM7502 Green	71
Philips BM7522 Ambger	75
Philips TV/Monitor	184
OPUS DISK DRIVES	
5401 100K + DDOS	122
5400 100K	95
Megabyte Marvel (5802/ddos)	198
Chalenger 3	215
COMPUTER CONCEPTS ROMS	
Wordwise Plus	45
InterSheet	45
InterChart	30
Disc Doctor	26
ACCESSORIES	
ATPL ROM Board	35
Voltmace Joysticks	
Delta 3B Single	10
Delta 3B Twin	16
Delta 14B Single	12
Delta 14B/1 Adapter	12
Disk/Tape Transfer	7

	£
PRINTERS	
Canon PW1080A NLQ/160cps	230
Canon PW1156A 156 Cols	356
Canon PJ1080A Color Inkjet	374
Juki 6000 12 cps	195
Juki 6100 18 cps	280
Juki 5510	243
Juki 5520 Color	389
Brother M1009	132
Brother HR-15 cent 18 cps	320
Epson LX-80 NLQ/100 cps	203
Epson FX 105 160 cps	415
Epson Hi-80 Printer/Plotter	315
Epson JX-80 color 7 cols.	495
Seikosha SP 1000A NLQ/100	180
Mannesmann Tally MT80 +	172
MODEMS	
Nightingale + Commstar Rom	119
Nightingale	99
Commstar Rom	29
Miracle WS 2000	108
BEEBUG SOFTWARE	
Wordease Disc	18
Spellcheck 111 Rom	31
Studio Eight Disk	19
Toolkit Plus Rom	34
AMX Mouse with SuperArt	67
Plinths for BBC	12
4 Way Mains Socket	10
Graph Pad	51
Island Logic Music System	24
Elephant SS/DD 5¼ Disks	13
BBC User Guide Acorn	15

BBC Micro Repairs Normal £28.50 7 Day Turnround.
Delivery FREE within 40 miles of Slough – Export orders undertaken.
Education orders a speciality – Instant credit on presentation of credit card – Add VAT to all prices.

WE OPEN ALL DAY SATURDAYS – POP IN AND SEE US ANYTIME.

DEMO DISK OFFER

LIGHTNING LEARNING
WITH
LINKWORD

FIRST COURSES (ON DISC FOR BBC (B))

FRENCH* GERMAN* SPANISH* ITALIAN*

NEW GREEK DUTCH RUSSIAN PORTUGUESE

SECOND COURSES (ON DISC FOR BBC (B))

NEW FRENCH GERMAN SPANISH ITALIAN

(IDEAL AS "FOLLOW-UP" COURSES TEACHING A FURTHER VOCABULARY AND GRAMMAR)

THE FASTEST, EASIEST, MOST ENJOYABLE METHOD OF LANGUAGE LEARNING EVER INVENTED!

"It's fun and it works – The Guardian.

"The best method I have come across for language learning" – Home Computer Weekly.

TURBO-BOOST YOUR VOCABULARY
FOR
HOLIDAYS SCHOOLWORK BUSINESS

AVAILABLE ON **DISK ONLY: £24.95** PER COURSE

DEMO **DISKS: £2.50**

FROM

ACCESS SOFTWARE LTD
100 BAKER STREET
LONDON W.1. TEL: 01-935 1470

* Previously available on cassette only from Acornsoft.

HSV COMPUTER SERVICES LIMITED

COMPUTER SUPPLIES AT LOW LOW PRICES!

CONTINUOUS STATIONERY

	QTY			
	250	500	1000	2000
9.5" × 11" 60 GSM MICRO-PERF ALL EDGES	£2.95	£4.95	£8.95	£14.95
TRUE A4 90 GSM MICRO-PERF ALL EDGES	£5.25	£8.75	£14.95	—
LABELS 3.5" × 1.5" (1 across)	—	£2.95	£4.95	£9.50
LABELS 4.0" × 1.5" (1 across)	—	£3.25	£5.50	£10.50
LABELS 4.0" × 1.5" (2 across)	—	£3.75	£6.50	£11.95

FX80 STATIONERY (fixed tractor printers)

	250	500	1000	2000
TRUE A4 80 GSM MICRO-PERF ALL EDGES	£6.95	£11.75	—	—
LABELS 4.0" × 1.5" (2 across)	—	£5.95	£10.50	—

PRINTER RIBBONS

	EACH
CANON PW1080A	**£3.25**
EPSON FX/LX/MX/RX80	£3.25
JUKI 6100 S/S	£1.75
JUKI 6100 M/S	£2.75
MANNESMANN TALLY MT80/80×	£4.75

	EACH
OKI MICROLINE 80/82/83	£1.75
SEIKOSHA GP80	£2.75
SHINWA CP80	£4.75
TAXAN KAGA	**£3.25**
WALTERS VM80	£4.75

DISKETTES (BOXED IN 10's)

StorageMaster LIFETIME GUARANTEE

3½"	SS/DD 135 TPI 80 TRACK	£24.95
	DS/DD 135 TPI 80 TRACK	£32.95
5¼"	SS/DD 48 TPI 40 TRACK	£12.95
	DS/DD 48 TPI 40 TRACK	£16.95
	SS/QD 96 TPI 80 TRACK	£17.95
	DS/QD 96 TPI 80 TRACK	£19.95

UNBRANDED 5 YEAR GUARANTEE

3½"	SS/DD 135 TPI	£22.50
	DS/DD 135 TPI	£28.95
5¼"	SS/DD 48 TPI	£8.95
	DS/DD 48 TPI	£9.95

DISKETTE STORAGE BOXES

	PRICE EACH
30 × 5¼ HINGED LID	£5.50
50 × 5¼" HINGED LID LOCKABLE	£8.95
70 × 5¼" HINGED LID LOCKABLE	£10.95
100 × 5¼" HINGED LID LOCKABLE	£13.95
40 × 3½ HINGED LID LOCKABLE	£9.95

ALL OUR PRICES INCLUDE CARRIAGE AND VAT – NO EXTRA'S TO PAY!

VISA

HSV COMPUTER SERVICES LIMITED, 40-42 New Market Square, Basingstoke, Hants RG21 1HS (0256) 463507

HSV

LARGEST COMPUTER CENTRE
in
MANCHESTER

COMPUTERS BUSINESS	
Amiga	Call
Atari 1040 Mono	£759.00
Atari 1040 Colour	£949.00
Ferranti 860	£1050.00
Ferranti XT10	£1825.00
Ferranti XT20	£1925.00
Ferranti 2860AT	£2775.00
Sharp PC7000	£1395.00
Sperry PC/IT	£2422.00
Sperry PC/IT Expanded	£3527.00
Apricot PC 2×315k+Mon.	£1100.00
Apricot PC 2×270k	£1310.00
Apricot XI10	£1990.00
Apricot F10 + Monitor	£1599.00
NEC Lapheld	£299.00
Sanyo Range	Call
Amstrad Main Dealer	
Epson PC	£745.00
Epson PC/FD	862.00
Epson PC/HD	1599.00
COMPUTERS HOME	
Amstrad 6128 Mono	£260.00
Amstrad 6128 Colour	£346.00
BBC Master	435.00
Commodore 128	CALL
Atari 520	CALL

SOFTWARE
Extensive selection. All above computers supported.

PRINTERS	
Brother M1409	CALL
Brother M1509	£485.00
Brother HR10	£260.00
Brother HR15	£347.00
Canon/Taxon	CALL
Juki 6100	£305.00
Juki 5510	£226.00
Star NL10	£252.15
Star SG15	£346.95
Star NB15	£765.00
Citizen MSP10	£226.00
Epson	CALL
Canon 8A1 Laser	£2150.00
Canon 8A2 Laser	£3175.00
Aptec 1 Ricoh Laser	£2150.00
RDS Laser	£2150.00
Qume Lasterten	£2375.00

WHAT ELSE?
Books, Monitors, Disks, Stationery, RAMs, ROMs, Joysticks, Hire.

BARGAIN CORNER	
Olivetti Printer	£69.00
Queendata Printer	£156.00
Apricto 9" Monitor	£100.00

Large Showroom.

All items exclude VAT

FREE delivery mainland UK for items £100 or over
Personal export specialists
All export items tested/tropicalised before despatch

MIGHTYMICRO

268 Wilmslow Road
Fallowfield, Manchester M14 6WL
Tel: 061-224 8117
Easy access M56, M61, M62, M63

8271 CONTROLLERS
EPROMS —— MEMORY
TEAC DRIVES 5¼" DISCS

Incl. VAT – LOW LOW PRICES – Incl. VAT

TEAC 55F 5¼" 80 TRACK D/SIDED DRIVES
Special purchase enables us to offer these top quality brand new single cased drives at an outstanding price.
Complete with BBC leads - One (400K)● **£114.00**
Two (800K) cabled together **£228.00**

3M BRANDED 5¼" DISCS
Boxes of 10 – 40T SS DD £10.00   80T DS DD £16.00

EPROMS *VPP 12.5V	
2764 - 250ns	£2.45
27128 - 250ns	£2.95
27256 - 250ns*	£5.35
27C256 - 250ns*	£6.95

MEMORIES	
4816 - 100ns	£0.95
6264 LP-15	£3.40
TMS 4416 - 20NL	£2.85

DFS KIT
8271 DFS KIT Complete with ACORN DNFS £53.50

SPECIAL OFFER – Deduct 10% for 3 or more of any products or 2 or more boxes of discs.

CONTROLLERS, CPU'S, ETC	
8271	£37.75
WD1770	£13.50
6502A CPU	£4.90
65C02 Low Power CPU	£8.20
6522 VIA	£3.60
6821 PIA	£1.45

TTL-DFS CHIPS ETC	
7438	£0.35
74LS10	£0.20
74LS123	£0.55
74LS136	£0.35
74LS163	£0.55
74LS174	£0.55
74LS244	£0.70
74LS245	£0.85
74LS393	£0.70
CD4013B	£0.45
CD4020B	£0.55

All prices are inclusive of VAT - Post & Ins. add 65p per order or for Drives add £3.40 (1) or £4.40 (2)
● State if 2nd Drive (DR1)

PO & Cheques to:
CP microsystems
32-34, Surbiton Road, Kingston upon Thames,
Surrey KT1 2HX.

Sorry - Mail order only - NO CALLERS PLEASE

SINK THE BISMARCK

A WARGAME SIMULATING
A MAJOR ACTION
OF WORLD WAR II
FOR
BBC B
plus DISK
only

24th MAY, 1941 — NORTH ATLANTIC

Day dawned amidst driving rain and snow, at 5.52 a.m. at a range of 15,000 yards the battleships **Hood** and **Prince of Wales** engaged the enemy. Within 6 minutes the **Hood** was rent apart by a mighty explosion and sank beneath the waves. After severely mauling the **Prince of Wales**, **Bismarck** headed south.

Nothing lay between her and the allied troop convoys, the order went out to every capital ship in the North Atlantic, "at all costs ... sink the Bismarck."

Sink the Bismarck, is an inter-active war game for 1 player. You are C-in-C, North Atlantic, you have at your disposal some of the finest ships in the Royal Navy but your adversary is the mightiest ship afloat!

The wargame attempts to create the atmosphere of the chase — with periods of quiet and frustration when you lose your quarry and other moments of intense action when shells weighing a ton each and fired from 20 miles away find their target.

£10.99 post paid
Please specify 40/80 track when ordering

Available from: Design People Software
77 Grimwade Street, Ipswich,
Suffolk, IP4 1LN.

EPROMS

HITACHI (or NEC where stated) QUALITY PRODUCTS
The reliable ones – 250nS or less – BBC compatible.
Prices INCLUDE VAT and UK post, normally by return.

NEC 2764C Once only programmable (no returns!)
3-9 pcs £1.75, 10+ pcs £1.50
2764 1-2 pcs £2.35, 3-9 pcs £2.25, 10+ pcs £2.15
27128 1-2 pcs £3.35, 3-9 pcs £2.95, 10+ pcs £2.50
27256 1-2 pcs £5.45, 3-9 pcs £5.20, 10+ pcs £5.00
Hit/NEC 27C256 1-2 pcs £7.25, 3+ pcs £6.90

RAMS

6264 LP 15 1-9 pcs £3.40, 10+ pcs £2.90
41254/41464-15 (Upgrading Solidisk) £7.00
48416 AP 15 (upgrading Watford) £2.95 each
41256 1-9 pcs £3.75, 10+ pcs £3.50

BBC EPROM PROGRAMMERS (DFS required – any)
BB-PROM for 2764, 27128 and 'A' versions £33.95
BB-PROM 32 for 27256 and 'A' versions £33.95
ERASERS. D1 £21.95, D2 (15 min timer) £26.50

DISKS

DS/DD 96 TPI. Hub-ring, sleeved. Box 10 £9.95
3" as CF2 type. 3-9 pcs £3.50, 10+ pcs £3.25
AMSTRAD PCW 8256 to 512k RAM Upgrade Kit £39.95

WE HAVE MOVED

and will now be able to give you even better service.
Our telephones are manned from 8am to 8pm most days.

Send UK cheques/Money Orders/LA or Gov't Orders to:

SILICON CITY
Mithian, St. Agnes, Cornwall, TR5 0QE.
Access/Visa orders, telephone **087 255 2112**

COMTEC

COMPUTER REPAIRS

- ○ Acorn approved repair centre.
- ○ Fast turnaround – normally 2 days
- ○ 3 Month warranty
- ○ Advanced diagnostic test equipment giving you very competitive prices starting from £12

Post your computer/disc drive/printer etc for FREE estimate.

SPECIAL OFFERS FOR THE BBC

4' printer parallel cables
e.g. Epson **£5.95** (inc VAT)
27128 EPROMS 1-9 **£2.95** each (inc VAT)
10+ **£2.50** each (inc VAT)

Please add 60p P&P.

COMTEC
St. George's Mill, 3 St. George's Street,
Macclesfield, Cheshire SK11 6TG.
Tel: (0625) 34691
Come to the experts who repair for the trade.

LOW COST C.A.D.

ATTENTION ALL ELECTRONICS CIRCUIT DESIGNERS !!

I.B.M. PC, BBC MODEL B and SPECTRUM 48K

ANALYSER I and II compute the A.C. FREQUENCY RESPONSE of linear (analogue) circuits. GAIN and PHASE, INPUT IMPEDANCE, OUTPUT IMPEDANCE and GROUP DELAY (except Spectrum version) are calculated over any frequency range required. The programs are in use regularly for frequencies between 0.1Hz to 1.2GHz. The effects on performance of MODIFICATIONS to both circuit and component values can be speedily evaluated.

Circuits containing any combination of RESISTORS, CAPACITORS, INDUCTORS, TRANSFORMERS, BIPOLAR AND FIELD EFFECT TRANSISTORS and OPERATIONAL AMPLIFIERS can be simulared – up to 60 nodes and 180 components (IBM version).

Ideal for the analysis of ACTIVE and PASSIVE FILTER CIRCUITS, AUDIO AMPLIFIERS, LOUDSPEAKER CROSS-OVER NETWORKS, WIDE BAND AMPLIFIERS, TUNED R.F. AMPLIFIERS, AERIAL MATCHING NETWORKS, TV I.F. and CHROMA FILTER CIRCUITS, LINEAR INTEGRATED CIRCUITS etc.

STABILITY CRITERIA AND OSCILLATOR CIRCUITS can be evaluated by "breaking the loop".

Tabular output on Analyser I. Full graphical output, increased circuit size and active component library facilities on Analyser II.

Check out your new designs in minutes rather than days.

ANALYSER can greatly reduce or even eliminate the need to breadboard new designs.

Full AFTER SALES SERVICE with TELEPHONE QUERY HOT LINE and FREE update service.

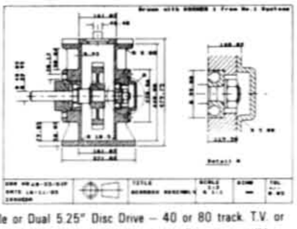
Used by INDUSTRIAL, GOVERNMENT and UNIVERSITY R & D DEPARTMENTS worldwide. IDEAL FOR TRAINING COURSES. VERY EASY TO USE. Prices from **£20 to £195.**

LOW COST COMPUTER DRAUGHTING ON THE BBC MODEL B

DRAWER I enables quality drawings to be created and modified, quickly, easily and with the minimum of hardware. All of the major program elements are written in machine code giving exceptional speed of operation.

FEATURES

- Rubber Banding for drawing lines.
- Solid or Dotted line types.
- Circles, Arcs and partial or complete Ellipses.
- Vertical or Horizontal Text.
- Pan and Zoom.
- Merging of drawings and library symbols from disc.
- Up to 20,000 lines on a drawing.
- Snap to a user defined grid.
- Absolute or Relative cursor co-ordinates displayed on screen.
- Input from analogue joystick, mouse or trackerball.
- Output to standard dot matrix printer.
- Price from £45 excl. VAT.



Minimum Hardware Required: BBC Model B. Single or Dual 5.25" Disc Drive – 40 or 80 track. T.V. or monitor. Games joystick Mouse or Trackerball. Dot matrix Printer (Epson 80 series or Epson compatible – BBC Default Mode.

For illustrated leaflets and ordering information please contact:

NUMBER ONE SYSTEMS LIMITED
Ref: MU. Crown Street, St. Ives, Huntingdon,
Cambs PE17 4EB. Tel: 0480 61778. Telex: 32339.

SERIAL SWITCHING DEVICES AND ACCESSORIES

PRINTERSHARER/CHANGER

1 PRINTER WITH UP TO 3 MICROS
OR
1 MICRO WITH UP TO 3 PRINTERS
RS 232-25 PIN D SOCKET **£65**
RS423 (BBC) 5 PIN DOMINO SOCKETS **£40**
5 PIN DIN SOCKETS – APPLE *IIC* **£50**
9 PIN D SOCKETS – MACINTOSH **£59**
6 PIN DIN SOCKETS – COMMODORE SERIAL **£40**

PRINTERCROSSOVER

2 SYSTEMS MAY USE EACH OTHERS PRINTER
RS 232 – 25 PIN D SOCKET **£70**
RS 423 (BBC) 5 PIN DOMINO SOCKET **£45**
5 PIN DIN SOCKETS – APPLE *IIC* **£60**
9 PIN D SOCKETS – MACINTOSH **£62**

RS232 – SERIAL TO PARALLEL CONVERTER

SELF-CONTAINED UNIT COMPLETE WITH *BUILT-IN POWER SUPPLY*. PLUGS INTO THE 36 PIN CENTRONICS SOCKET AT THE REAR OF THE PRINTER, LEAVING THE 25 WAY D TYPE SOCKET AT THE REAR OF THE CONVERTER AS THE SERIAL INPUT. DATA FRAMING (STOP BITS/PARITY ETC) AND BAUD RATES 150 TO 19200 SELECTABLE BY DIP SWITCHES. **£65**

PARALLEL TO SERIAL CONVERTER AS ABOVE – REVERSED £70.

RS 232 SURGE PROTECTOR

POWER SPIKES CAN OCCUR ANYWHERE! EVEN IN RS 232 LINES! PLUG THE SURGE PROTECTOR INTO RS 232 PORTS TO PREVENT COSTLY EQUIPMENT DAMAGE AND DATA LOSS FROM VOLTAGE SURGES CAUSED BY LIGHTNING, ELECTRICAL INTERFERENCE, STATIC DISCHARGES. **£20.**

RS 232 GENDER CHANGER (SHIELDED)

A QUICK AND INEXPENSIVE WAY TO AVOID MODIFYING OR REPLACING INCOMPATIBLE RS 232 CABLES OR EXTENDING RS 232 CABLES. ALL 25 PINES ARE LIVE, M/M & F/F. **£10.**

CABLES & CONNECTORS

RS 232 - 25D PLUG EACH END - 6FT **£12.00**
RS 232 - 9 PIN D PLUG EACH END FOR MACINTOSH - 6FT. **£12.00.**
RS 232 - 9 PIN TO 25D - PRINTER CABLE. 6FT FOR MACINTOSH **£12.50**
RS 423 - 5 PIN DOMINO DIN PLUG EACH END. 6FT. **£4.00**
RS 232 - 5 PIN DIN TO 25D PLUG FOR APPLE *IIC*. **£9.00**

KEYZONE LTD.
U14, REGENERATION HOUSE, SCHOOL ROAD,
PARK ROYAL, LONDON NW10 6TD
TELEPHONE: 01-965 1684/1804. TELEX: 8813271

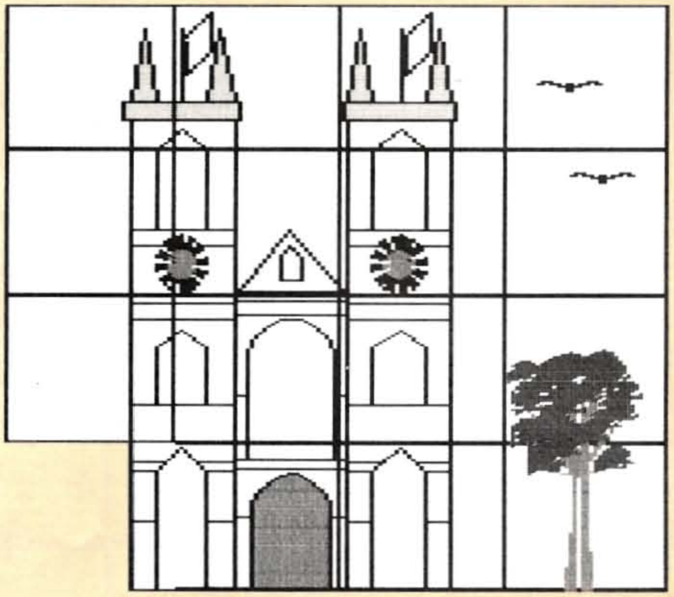
From Page 21

```
   10REM*********************
   20REM*   ROYAL WEDDING   *
   30REM*   by Gordon Key &  *
   40REM*   David McLachlan  *
   50REM* (c) The Micro User *
   60REM*********************
   70MODE7:PRINTTAB(12,10)"Please wai
t."
   80VDU23;8202;0;0;0;
   90VDU21:*FX5
  100PROCcode:PROCcode2:*FX21
  110*KEY0FORT%=0TOTOP-PAGE STEP4:T%!
&1100=T%!PAGE:NEXT|MPAGE=&1100|MO.|MR
UN|M
  120*KEY 1DELETE 3320,5110|MDELETE 1
0,160|MO.|MRUN|M
  130*KEY2 DELETE 2510,2720|MDELETE 1
70,240|MO.|MRUN|M
  140VDU6:PRINTTAB(6,12)"Deleting Ass
embler Code":VDU21
  150*FX138,0,129
  160END
  170IFPAGE<=&1100 THEN 210
  180VDU6:PRINTTAB(12,14)"Relocating"
:VDU21
  190*FX138,0,128
  200END
  210VDU6
  220MODE 2
  230CLEAR
  240PROCtitle
  250VDU6
  260*FX21
  270A=GET
  280ONERRORIFERR=17THENCLEAR ELSE EN
D
  290MODE 7
  300HIMEM=&3000
  310A%=EVAL(FNinst)
  320IF gc%<>111 PROCgrid(0)
  330CLEAR
  340PROCplay
  350END
  360DEFPROCplay
  370REPEAT
  380N%=FNget
  390PROCmove
  400UNTIL0
  410ENDPROC
  420DEFPROCmove
  430IFA%=FALSE ORTIME<E% ENDPROC
  440VDU19,A%,7;0;:A%=A%MOD11+1:VDU19
,A%,4;0;:TIME=0
  450ENDPROC
  460DEFFNget
  470LOCAL h%
  480N%=O%
  490get=0:IF H%>=500 VDU7:get=GET:IF
 get<>13 AND get<>67 THEN 490
  500IF get=67 H%=0 ELSE IF get=13 PR
OCsolve(5)
  510IFINKEY(-67)ANDO%MOD4N%=O%-1:h%=
1:I%=-67
  520IFINKEY(-98)ANDO%MOD4<>3N%=O%+1:
h%=2:I%=-98
  530IFINKEY(-105)ANDO%>3N%=O%-4:h%=3
:I%=-105
  540IFINKEY(-73)ANDO%<12N%=O%+4:h%=4
:I%=-73
  550IFINKEY(-74)ANDS% PROCsolve(5)
  560IFINKEY(-97)PROCshuffle
  570IFh% PROCs(h%-1):REPEAT:PROCdel(
1):UNTILNOTINKEYI%
  580*FX21
  590=N%
  600DEFPROCdel(d%)
  610LOCALT%
  620FORT%=0TOd%*5:PROCmove:NEXT
  630ENDPROC
  640DEFPROCs(h%)
  650P%=P%+2:IFP%=8:H%=H%+1:P%=0:H%?D
%=0
  660h%=h%*2^P%:H%?D%=H%?D% OR h%:SOU
ND&10,-15,4,1:S%=TRUE
  670CALLM%,N%,O%
  680ENDPROC
  690DEFPROCsolve(d%)
  700LOCALh%
  710REPEAT
  720h%=(H%?D% AND3*2^P%)DIV2^P%
  730N%=O%+(1-(h%>1)*3)*(1+((h%AND1)=
1)*2)
  740CALLM%,N%,O%
  750PROCdel(d%)
  760SOUND&10,-15,5,1
  770P%=P%-2:IFP%<0 H%=H%-1:P%=6
  780UNTILH%=-1
  790S%=FALSE
  800ENDPROC
  810DEFPROCshuffle
  820LOCALf%,g%,h%
  830FORT%=0TO40
  840g%=f%
  850f%=FALSE:REPEAT
  860REPEAT
  870PROCmove
  880h%=RND(4)
  890UNTILh%<>g%
  900IFh%=1ANDO%MOD4:N%=O%-1:f%=2
  910IFh%=2ANDO%MOD4<>3:N%=O%+1:f%=1
  920IFh%=3ANDO%>3:N%=O%-4:f%=4
  930IFh%=4ANDO%<12:N%=O%+4:f%=3
  940UNTILf%
  950PROCs(h%-1)
  960NEXT
  970ENDPROC
  980DEFFNpic1
  990VDU22,2,23;8202;0;0;0;
 1000PROCdim
 1010PROCgrid(3)
 1020RESTORE 3190
 1030GCOL0,7
 1040FORL%=1 TO 105
 1050READ X%,Y%
 1060IF X%=0 AND Y%=0 READ X%,Y%:MOVE
 X%-100,Y%
 1070DRAW X%-100,Y%
 1080NEXT
 1090FOR LO=0 TO 420 STEP 420
 1100RESTORE 3240
 1110READ X%,Y%:MOVE X%+LO-100,Y%
 1120FOR LOOP=1 TO 6:READ X%,Y%:PLOT
1,X%,Y%:NEXT
 1130NEXT
 1140GCOL 0,7
 1150RESTORE 3190
 1160FOR L%=1 TO 69
 1170READ X%,Y%
 1180IF X%=0 AND Y%=0 READ X%,Y%:MOVE
 X%+320,Y%
 1190DRAW X%+320,Y%
 1200NEXT
 1210PROCc(340,570,50,24,2,1,3):PROCc
(340,570,25,24,2,1,1):PROCc(552,390,8
5,12,1,2,7):PROCc(552,130,75,12,1,2,7
):PROCc(760,570,50,24,2,1,3):PROCc(76
0,570,25,24,2,1,1):PROCf(550,5,1):PRO
Cf(270,900,4)
 1220PROCf(415,900,4):PROCf(685,900,4
):PROCf(835,900,4):PROCf(270,850,4):P
ROCf(690,850,4):PROCf(350,850,4)
 1230RESTORE 3250
 1240FOR Q%=1 TO 8:READ Z:GCOL 0,Z
 1250FOR B%=1 TO 4:READ A,B,C:PLOT A,
B,C
 1260NEXT:NEXT
 1270FOR X=1 TO 20
 1280MOVE 1110,200
 1290GCOL 0,1:X%=RND(200)+1000:Y%=RND
(200)+200:DRAW X%,Y%:PROCc(X%,Y%,30,1
2,2,1,2)
 1300NEXT
 1310FOR X=1 TO 25:X%=RND(200)+1000:Y
%=RND(200)+200:PROCc(X%,Y%,30,12,2,1,
2):NEXT
 1320seagull$=CHR$(230)+CHR$(231):fla
p1$=CHR$(234)+CHR$(232):flap2$=CHR$(2
35)+CHR$(233)
 1330VDU5:GCOL0,7:MOVE 1024,896:PRINT
 seagull$
 1340GCOL0,8:MOVE 1024,896:PRINTflap1
$
 1350GCOL0,15:MOVE 1024,896:PRINTflap
```

→

From Page 109

```
2$
 1360GCOL 0,7:MOVE 1088,736:PRINTseag
ull$
 1370GCOL 0,15:MOVE 1088,736:PRINTfla
p1$
 1380GCOL 0,8:MOVE 1088,736:PRINTflap
2$
 1390gc%=111
 1400=FALSE
 1410DEF PROCf(X%,Y%,C%)
 1420y%=Y%
 1430GCOL 0,C%
 1440REPEAT
 1450PLOT 77,X%,Y%
 1460Y%=Y%+4
 1470UNTIL POINT(X%,Y%)
 1480Y%=y%
 1490REPEAT
 1500PLOT 77,X%,Y%
 1510Y%=Y%-4
 1520UNTIL POINT(X%,Y%)
 1530ENDPROC
 1540DEFFNpic3
 1550VDU22,2,23;8202;0;0;0;
 1560VDU20,1,1,0,0,0,:VDU26,1279;1023
;:VDU19,3,4,0,0,0,:GCOL 0,129:CLG:GCO
L 0,7
 1570gc%=0:RESTORE 3270
 1580FOR LOOP=1 TO 2
 1590FOR LOOP2=1 TO 24
 1600READ A,B,C,:PLOT A,B,C
 1610NEXT
 1620READ D:GCOL 0,D
 1630NEXT
 1640=FALSE
 1650DEFFNpic2
 1660VDU22,2,23;8202;0;0;0;
 1670GCOL 0,135:CLG
 1680PROCdim
 1690PROCgrid(0)
 1700PROCc(450,700,200,24,1,1,1)
 1710PROCc(840,700,200,24,1,1,1)
 1720MOVE 270,620:DRAW 645,50:PLOT 85
,1025,620
 1730DRAW 650,660:PLOT 85,270,620
 1740L%=&900:?L%=3:L%?1=4:L%?2=16:L%?
3=16
 1750CALL (L%+&C2)
 1760GCOL0,4
 1770PROCwriteword(200,800,"Andrew")
 1780PROCwriteword(565,550,"&")
 1790PROCwriteword(300,300,"Sarah")
 1800gc%=111
 1810=FALSE
 1820DEF PROCwriteword(x%,y%,word$)
 1830L%!4=x%:L%!6=y%
 1840FOR 1%=1 TO LEN(word$)
```



```
 1850L%?&0C=ASC(MID$(word$,1%,1))
 1860CALL (L%+&15)
 1870NEXT
 1880ENDPROC
 1890DEFFNpic4
 1900VDU22,2,23;8202;0;0;0;
 1910PROCdim
 1920VDU19,15,7;0;
 1930COLOUR143:CLS
 1940FORT%=1TO12
 1950GCOL0,T%
 1960VDU19,T%,4;0;
 1970I%=T%*2
 1980PROCc(640+475*c(I%),512+375*s(I%
),100,24,1,1,T%)
 1990MOVE640+475*c(I%),512+375*s(I%):
DRAW640,512
 2000VDU19,T%,7;0;
 2010NEXT
 2020VDU19,4,4;0;
 2030E%=10:gc%=0
 2040=4
 2050DEFFNpic5
 2060LOCALF%
 2070REPEAT
 2080F%=FALSE
 2090CLS:gc%=0
 2100PRINTTAB(0,5)"Please enter the r
equired filename"
 2110PRINT"or a '*' command"''
 2120INPUT$D%
 2130IFLEFT$($D%,1)<>"*"$D%="LOAD "+$
D%+" 3000":VDU22,2,23;8202;0;0;0;:VDU
28,0,31,4,25 ELSEF%=TRUE
 2140X%=D%MOD256:Y%=D%DIV256:CALL&FFF
7
 2150*FX21
 2160IFF% PRINT''"Please press space"
:REPEATUNTILGET=32:UNTILFALSE
 2170UNTILTRUE
 2180=FALSE
 2190DEFPROCc(X%,Y%,R%,FI%,ST%,TY%,CO
L%)
 2200GCOL 0,COL%
 2210IF ST%=2 AND FI%=24 FI%=23
 2220LOCALT%
 2230MOVEX%,Y%
 2240FORT%=0TO FI% STEP ST%
 2250MOVEX%,Y%
 2260IF ST%=2 DRAW X%+c(T%)*R%,Y%+s(T
%)*R%
 2270IF ST%=2 PLOT85,X%+c(T%+1)*R%,Y%
+s(T%+1)*R%
 2280IF ST%=1 AND TY%=1 PLOT85,X%+c(T
%)*R%,Y%+s(T%)*R%
 2290IF TY%=2 MOVE X%+c(T%)*R%,Y%+s(T
%)*R%:DRAW X%+c(T%+1)*R%,Y%+s(T%+1)*R
%
 2300PLOT85,X%+c(T%)*R%,Y%+s(T%)*R%
 2310NEXT
 2320ENDPROC
 2330DEFPROCgrid(gc%)
 2340GCOL0,gc%
 2350FORX%=0TO1279STEP320
 2360MOVEX%,0
 2370DRAWX%,1024
 2380NEXT
 2390FORY%=0TO1023STEP256
 2400MOVE0,Y%
 2410PLOT0,0,4
 2420PLOT81,1280,-4
 2430PLOT81,0,4
 2440NEXT
 2450IF gc%<>0 MOVE 1279,0:DRAW 1279,
1023:DRAW 0,1023
 2460GCOL0,128
 2470VDU24,0;0;320;256;:CLG:VDU26
 2480H%=-1:P%=6
 2490O%=12:S%=FALSE
 2500ENDPROC
 2510DEFPROCtitle
 2520A%=0:VDU23;8202;0;0;0;
 2530COLOUR135
 2540CLS:VDU19,2,4;0;
 2550PROCbig("ROYAL",7,8,2)
 2560PROCbig("WEDDING",6,13,1)
 2570PROCdel(100)
 2580PRINTTAB(2,19)"By Gordon Key &"
 2590PRINTTAB(2,22)"David McLachlan"
 2600PROCdel(200):PROCgrid(0):A%=FALS
E:PROCshuffle:PROCdel(100):PROCsolve(
1):PROCdel(200)
 2610CLS
 2620PRINTTAB(1,1)"TO MOVE BLOCKS USE
":PRINTTAB(1,3)"THE FOLLOWING KEYS"
 2630COLOUR 2:PRINTTAB(3,8)"Z.......L
eft"
 2640PRINTTAB(3,11)"X.......Right"
 2650PRINTTAB(3,14)":.......Up"
 2660PRINTTAB(3,17)"/.......Down"
 2670PRINTTAB(3,20)"Tab.....Shuffle"
 2680PRINTTAB(3,23)"Return..Reset"
 2690COLOUR 1:PRINTTAB(2,28)"Any key
to start"
 2700VDU21,19,2,2;0;
 2710*FX138,0,130
 2720END
 2730DEFFNinst
 2740VDU22,7:VDU23;8202;0;0;0;
 2750FORT%=2TO23:PRINTTAB(0,T%)CHR$15
7CHR$132TAB(38)CHR$156:NEXT
 2760VDU28,2,23,37,2
 2770C%=65
 2780FOR p=1 TO 2:PRINTTAB(3,p)CHR$14
1;CHR$129;"R O Y A L  W E D D I N G"
 2790NEXT
 2800PRINT':RESTORE 3310
 2810REPEAT
 2820READA$:UNTILLENA$>5
 2830REPEAT
 2840PRINTTAB(4);CHR$(C%);CHR$(VAL(RI
GHT$(A$,3)))STRING$(8,".")LEFT$(A$,LE
N(A$)-3)'
 2850READA$
 2860C%=C%+1
 2870UNTILA$="E"
 2880PRINTTAB(4)"Escape ...To return
to menu"
 2890PRINT''TAB(3)CHR$129"Please sele
ct a letter"
 2900*FX21
 2910REPEAT
 2920T%=GET AND &DF
 2930UNTILT%>64 ANDT%<70
 2940="FNpic"+STR$(T%-64)
 2950ENDPROC
 2960DEFPROCdim
 2970DIMc(24),s(24)
 2980T%=0
 2990FORT=0TO2*PI STEP2*PI/24
 3000c(T%)=COS(T):s(T%)=SIN(T)
 3010T%=T%+1:NEXT
 3020ENDPROC
 3030DEFPROCbig(A$,X%,Y%,c%)
 3040VDU31,X%,Y%
 3050COLOURc%
 3060LOCALa%,b%,d%,A%
 3070FORa%=1TOLENA$
 3080?D%=ASC(MID$(A$,a%,1))
 3090SOUND1,2,?D%,1
 3100X%=D%MOD256:Y%=D%DIV256:A%=&A:CA
LL&FFF1
 3110FORb%=0TO1
 3120VDU23,b%+130
 3130FORc%=0TO3:FORd%=0TO1
 3140VDUD%?(c%+b%*4+1)
 3150NEXT:NEXT:NEXT
 3160VDU130,10,8,131,11
 3170NEXT
 3180ENDPROC
 3190DATA 0,0,330,855,340,855,365,980
,390,855,490,855,515,980,540,855,550,
855,550,820,540,820,540,770,490,770,4
40,805,390,770,340,770,340,820,540,82
0,330,820,330,855,550,855,0,0,340,770
,340,630,390,630,390,770
 3200DATA 0,0,390,630,490,630,490,770
,0,0,490,630,540,630,540,770,540,0,34
0,0,340,630,340,600,400,600,0,0,480,6
00,540,600,0,0,340,500,540,500,0,0,34
0,475,540,475,0,0,340,325,390,325,390
,425,440,455,490,425,490,325,540,325,
390,325
 3210DATA 0,0,340,225,405,225,0,0,475
,225,540,225,540,210,490,210,440,250,
390,210,340,210,390,210,390,120,340,1
20,390,120,390,0,490,0,490,120,540,12
0,490,120,490,210,0,0,540,520,760,520
,752,520,650,630,552,520
 3220DATA 0,0,650,600,632,580,632,540
,672,540,672,580,650,600,0,0,540,505,
760,505,0,0,540,480,760,480,0,0,540,2
30,565,230,565,390,565,230,737,230,73
7,390,737,230,760,230,760,215,540,215
,0,0,540,340,565,340
 3230DATA 0,0,745,340,760,340,760,130
,725,130,725,0,575,0,575,130,540,130,
540,0,760,0
 3240DATA 440,855,0,125,0,-10,10,0,0,
-70,-10,0,10,0
 3250DATA8,4,345,900,1,40,10,1,0,65,1
,-40,-15,8,4,770,900,1,40,10,1,0,70,1
,-40,-10,15,4,770,900,1,50,40,1,0,70,
1,-50,-40,15,4,350,900,1,45,40,1,0,70
,1,-45,-40,7,4,390,934,5,390,938,4,81
0,934,5,810,938,1,4,1085,0,1,0,40,4,1
093,0,1,0,100
 3260DATA1,4,1130,0,1,0,70,4,1100,0,1
,0,250,1,1,25,0,1,0,-250,1,-6,0,1,0,2
50
 3270DATA4,0,80,5,440,430,85,0,430,4,
0,590,5,440,590,85,0,940,4,80,1023,5,
560,640,85,560,1023,4,720,1023,5,720,
640,85,1200,1023,4,1279,940,5,840,590
,85,1279,590,4,1279,430,5,840,430,85,
1279,80,4,1200,0,5,720,380,85,720,0,4
,560,0,5,560,380
 3280DATA85,80,0,3,4,0,660,5,290,660,
85,0,900,4,180,1023,5,520,750,85,520,
1023,4,790,1023,5,790,740,85,1140,102
3,4,1279,860,5,1000,640,85,1279,640,4
,1279,360,5,980,360,85,1279,120,4,110
0,0,5,760,260
 3290DATA85,760,0,4,490,0,5,490,270,8
5,140,0,4,0,160,5,280,380,85,0,380,0
 3300DATA6,134,16
 3310DATA Westminster Abbey132,Royal
couple132,Union Jack132,Souvenir ball
oon132,Load own picture132,E,1,4,6,9
 3320DEFPROCcode
 3330scrnpoint=&80
 3340varpoint=&70
 3350FORT%=0TO2STEP2
 3360P%=&110
 3370M%=P%
 3380[OPTT%
 3390LDA&601:STAvarpoint
 3400LDA&602:STAvarpoint+1
 3410LDA&604:STAvarpoint+2
 3420LDA&605:STAvarpoint+3
 3430LDY#0
 3440LDA(varpoint+2),Y:AND#15
 3450TAX
 3460LDApointerl,X:STAscrnpoint+2
 3470LDApointerh,X:STAscrnpoint+3
 3480LDA(varpoint),Y:AND#15
```

→

From Page 111

```
3490STA(varpoint+2),Y
3500TAX
3510LDApointerl,X:STAscrnpoint
3520LDApointerh,X:STAscrnpoint+1
3530LDX#8
3540.loop1
3550LDY#160
3560.loop2
3570LDA(scrnpoint),Y
3580STA(scrnpoint+2),Y
3590LDA#0
3600STA(scrnpoint),Y
3610DEY:BNEloop2
3620DEX:BEQout
3630CLC:LDAscrnpoint
3640ADC#&80:STAscrnpoint
3650LDAscrnpoint+1
3660ADC#2:STAscrnpoint+1
3670CLC:LDAscrnpoint+2
3680ADC#&80:STAscrnpoint+2
3690LDAscrnpoint+3
3700ADC#2:STAscrnpoint+3
3710SEC:BCSloop1
3720.out
3730RTS
3740.pointerl
3750]:P%=P%+16:[OPTT%
3760.pointerh
3770]:NEXT
3780D%=&A00
3790FORY%=0TO3
3800FORX%=0TO3
3810A%=&3000+X%*160+Y%*&1400-1
3820pointerl?(X%+Y%*4)=A%MOD256
3830pointerh?(X%+Y%*4)=A%DIV256
3840NEXT
3850NEXT
3860ENVELOPE1,0,0,0,0,0,0,0,126,-4,-
3,-3,126,100
3870ENVELOPE2,1,0,0,0,0,0,0,63,43,0,
-63,63,126
3880VDU6,23,230,0,0,112,29,7,1,1,0
3890VDU23,231,0,0,14,184,224,128,128
,0
3900VDU23,232,1,3,0,0,0,0,0,0
3910VDU23,233,0,0,0,3,0,0,0,0
3920VDU23,234,128,192,0,0,0,0,0,0
3930VDU23,235,0,0,0,192,0,0,0,0,21
3940ENDPROC
3950DEFPROCcode2
3960 OSWORD=&FFF1
3970 OSWRCH=&FFEE
3980 FOR pass%=0 TO 2 STEP 2
3990P%=&900
4000 [
4010 OPT pass%
4020 .width NOP
4030 .depth NOP
4040 .xstep NOP
4050 .ystep NOP
4060 .xpos NOP:NOP
4070 .ypos NOP:NOP
4080 .xstore NOP:NOP
4090 .ystore NOP:NOP
4100 .pattern NOP
4110 ]
4120 $P%="12345678"
4130 P%=P%+8
4140  [ OPT pass%
4150 .start LDX # pattern MOD 256
4160 LDY # pattern DIV 256
4170 LDA # &0A
4180 JSR OSWORD
4190 LDA ypos
4200 STA ystore
4210 LDA ypos+1
4220 STA ystore+1
4230 LDY # 0
4240 .outer_loop LDA xpos
4250 STA xstore
4260 LDA xpos+1
4270 STA xstore+1
4280 LDA pattern+1,Y
4290 LDX # 0
4300 .inner_loop ASL A
4310 BCC noprint
4320 PHA
4330 TXA:PHA
4340 TYA:PHA
4350 JSR write
4360 PLA:TYA
4370 PLA:TXA
4380 PLA
4390 .noprint PHA
4400 CLC
4410 LDA xstore
4420 ADC xstep
4430 STA xstore
4440 LDA xstore+1
4450 ADC # 0
4460 STA xstore+1
4470 PLA
4480 INX
4490 CPX # 8
4500 BNE inner_loop
4510 SEC
4520 LDA ystore
4530 SBC ystep
4540 STA ystore
4550 LDA ystore+1
4560 SBC # 0
4570 STA ystore+1
4580 INY
4590 CPY # 8
4600 BNE outer_loop
4610 CLC
4620 LDA xstore
4630 ADC xstep
4640 STA xpos
4650 LDA xstore+1
4660 ADC #0
4670 STA xpos+1
4680 RTS
4690 .write LDA # 5
4700 JSR OSWRCH
4710 LDA # &19
4720 JSR OSWRCH
4730 LDA # 4
4740 JSR OSWRCH
4750 LDA xstore
4760 JSR OSWRCH
4770 LDA xstore+1
4780 JSR OSWRCH
4790 LDA ystore
4800 JSR OSWRCH
4810 LDA ystore+1
4820 JSR OSWRCH
4830 LDA # &E0
4840 JSR OSWRCH
4850 LDA #4
4860 JSR OSWRCH
4870 RTS
4880 .definer LDA # 23
4890 JSR OSWRCH
4900 LDA # &E0
4910 JSR OSWRCH
4920 LDA # 0
4930 LDX width
4940 .define_row SEC
4950 ROR A
4960 DEX
4970 BNE define_row
4980 LDY depth
4990 .send_rows JSR OSWRCH
5000 DEY
5010 BNE send_rows
5020 .send_blanks
5030 LDY # 8
5040 LDA # 0
5050 .blank JSR OSWRCH
5060 DEY
5070 BNE blank
5080 RTS
5090 ]
5100 NEXT pass%
5110ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 141.

WHY PAY MIDDLEMAN'S PROFITS?

DEAL DIRECT WITH THE LONGEST-ESTABLISHED AUTHOR IN THE BUSINESS!

Derrick Daines, 18 Cuttings Avenue,
Sutton-in-Ashfield, Notts. NG17 1JL.

Teacher - author - broadcaster - founder member of MAPE. Thousands of my programs are already in use all over the world!

TAPE 1 — 16 programs: Quickdraw (D), Market (D), Pattern (D), Bomb (G), Bike (D), Plates (D), Tuttle (EG), Score (G), Greed (G), Pakipool (G), Slide (G), Roadrun (G), Torpedo (G), Series (EG), Wordsq (G), Derby (G).

TAPE 2 — 10 programs: Bingo (G), Anagram (EG), Simon (G), Readnum (EG), Snap (EG), Pontoon (G), Scribble (EG), Cape Horn (EG), RPL Calculator (EU), Moses (EG).

TAPE 3 — Colditz. (G) Eight routes to freedom. Can you find ANY of them?

D=Demo. **G**=Game. **U**=Utility.
E=Educational. *(Teacher's notes available)*

BBC TAPES ONLY **£4.95** EACH, POST FREE.

Some of these programs have been selling for £9.95 each! Cut out the middleman; at these prices, how can you go wrong? All tapes professionally produced and guaranteed. Official orders accepted.

GPD Systems

COMPUTERS

BBC Master 128	**£489.00**
BBC + 64k + DFS	**£420.00**
BBC + 128k + DFS	**£447.00**
BBC PCU with twin diskdrives, remote keyboard	**£459.00**

DISK DRIVES

MD400A 80/40	**£121.00**
MD802E Dual 80/40	**£299.00**

DISKETTES 5¼", 3½" & 3" available

80T DS.DD + Library Case	**£18.00**
40T SS.DD + Library Case	**£14.50**

OSCILLOSCOPES

New and reconditioned, from	**£115.00**

PRINTERS

Shinwa CPA-80	**£184.00**
Taxan KP-810	**£195.00**
Epson LX inc. Tractor Feed	**£239.00**
Canon 1080. 26	**£269.00**

MONITORS

IBM-BBC Colour	**£166.00**
Microvitec 1431	**£185.00**

CAL. CAD. Business Software
Most ROM, Disk and Cassette programs for Education, Commerce and Industry.
Wordprocessing Supplies and Packages.
Upgrades and Updates to most micros.
Education Orders Welcome. Mail Order Only.

All prices include VAT. Delivery extra.

31 Abbey Road, Billericay, Essex CM12 9NF.
Tel: (02774) 51443 Billericay, Essex.

ABBADISH
COMPUTER SERVICES

MONITORS

Microvitec 1431	£216
Microvitec 1451	£258
Taxan KP1203+ High res	£345
Yanjen 1211 High res (Amber) + swivel stand	£82
Philips BM7502 (Green)	£80
Philips BM7522 (Amber)	£86

DISK DRIVES

Cumana CSX100 40T	£99
Cumana CSX400S D/S 40/80T	£147
Cumana CDX800s Dual D/S 40/80T	£279
Cumana CS400s D/S 40/80T	£168
Cumana CD800 Dual 40/80T	£313

PRINTERS

Mannesman Tally MT80+	£202
Mannesman Tally MT85 NLQ	£369
Mannesman Pix3 colour plotter	£260
Quen Data DWP1120 daisy wheel	£190
Epson FX85	£430
Epson LX80	£253
Epson LX80 Tractor Feed	£19
Juki 6100 daisy wheel	£344

BBC MASTER SERIES

BBC Master 128	£472
BBC Master Turbo Upgrade	£128
BBC 6502 upgrade	£189
BBC Z80 upgrade	£380

SOFTWARE

View	£49
View Sheet	£49
View Store	£49
View Spell	£33
View 3.0	£73
6502 Development pack	£40
Cumana D/S 96tpi disks box of 10	£18

All prices inclusive of VAT

Please add £7.00 postage and packing on all printers and monitors; add £2.00 on software etc.

Mail order only to:
ABBADISH COMPUTER SERVICES
Walden School Lane, Eastergate, Chichester,
W. Sussex PO20 6UU

C & F ASSOCIATES
SELECTED BBC PROGRAMS

Title	RRP	Our Price
Commando	9.95	7.50
Yie Ar Kung Fu	9.95	7.50
Exploding Fist	9.95	7.50
Bruce Lee	9.95	7.50
Cosmic Battlezones	9.95	7.50
Jump Jet	9.95	7.50
Moon Cresta	7.95	6.50
Bug Eyes 2	7.95	6.50
Winter Olympics	7.95	6.50
Steve Davies Snooker	8.95	6.95
Rick Hanson	9.95	7.95
Project Thesius	9.95	7.95
Countdown	8.95	6.95
Worm in Paradise	9.95	7.95
Sabre Wulf	9.95	7.50
Repton	9.95	7.50
Repton 2	9.95	7.50
Speech	9.95	7.50
Citadel	9.95	7.50
Nightshade	9.95	7.50
Strike Force Harrier	9.95	7.50
Karate Combat	8.95	6.95
Phantom Combat	9.95	7.50
Scrabble	12.95	10.95
Death Star	9.95	7.50
Price of Magik	9.95	7.50
Wizardore	7.95	6.50
Caveman Capers	7.95	6.50

Title	RRP	Our Price
Mini Office 2	14.95	12.45
10 Computer Hits 2	9.95	7.50
Lord of the Rings	15.95	13.95
Bombjack	9.95	7.50
Southern Belle	7.95	6.50
Stairway to Hell	12.95	10.95

BBC DISC SOFTWARE

Mini Office 2	16.95	14.95
Hyper Sports	12.95	10.95
Enthar 7	15.95	14.95
Rick Hanson	11.95	10.45
Project Thesius	11.95	10.45
Speech	11.95	10.45
Exploding Fist	14.95	12.95
Yie Ar Kung Fu	12.95	10.95
Citadel	11.95	10.45
Steve Davis Snooker	12.95	10.95
Scrabble	14.95	12.95
The Hobbit	17.95	15.95
Lord of the Rings	19.95	16.95
Karate Combat	11.95	10.45
Bruce Lee	14.95	12.95
Powerplay	14.95	12.95
Olympic Decathlon	9.95	7.50
The Quill	22.95	19.95
Command	14.95	12.95

ALL PRICES INCLUDE VAT AND POSTAGE & PACKING
(Overseas orders please add £1.00 per item

Cheques/PO payable to:
C & F ASSOCIATES
AND SEND TO
C & F ASSOCIATES (MU) PO BOX 2 BIDEFORD EX39 3RE
Tel: 023 73 619
Orders normally despatched within 24 hours of receipt
but allow maximum of 7 days.

Advanced Technology Products Limited

B.U.5.
Station Road, Clowne,
Chesterfield, S43 4AB.
☎ (0246) 811585 (4 lines)

SIDEWISE

No. 1 MARKET LEADER

SIDEWISE, ROM/RAM EXPANSION FOR THE BBC MICRO

- ★ Full Sideways ROM Expansion to a total of 16 ROMS.
- ★ 16K Battery Backed CMOS RAM Option - Ram is treated as ROM no 15 on read.
- ★ Software for Sideways ROMS may be down loaded and run in RAM under true Sideways environment. See below for details of software packages available.
- ★ An ideal tool for Sideways ROM program development with the addition of RAM.
- ★ Plug-in-and go construction mounts neatly inside the BBC.
- ★ No soldering required to fit Sidewise.
- ★ Full buffering of address and data busses - prevents data bus loading problems associated with unbuffered boards.

Join the 10's of thousands of happy users.

£38.00 + £1.00 P&P + VAT

OPTIONS FOR SIDEWISE

Battery back up kit

£17.00 + 50p P&P + VAT

CMOS RAM 8K Bytes

£5.00 + 50p P&P + VAT

Buy 2 for £8.00 + 50p P&P + VAT

SIDEWISE PLUS

The Sideways ROM Board for the new BBC B+ Computer

- ★ Full Sideways expansion to a total of 10 x 16K ROMS.
- ★ Mounts neatly over the Sideways area inside BBC+ Micro.
- ★ No soldering required to fit Sidewise Plus.
- ★ Fully buffered board.

£29.95 + £1.00 P&P + VAT

SOFTWARE PACKAGES

A range of software specifically designed to enhance and extend the use of Sideways RAM on ATPL Sidewise and other products.

★ **SPOOLIT** Allows the Sideways RAM to be used as a 8K or 16K printer buffer.

£10.00 + 50p P&P + VAT

★ **DFS SHIFT** Moves the user RAM workspace required by the DFS into Sideways RAM. Allows memory recovery to & 0E00. Works with Acorn .9DFS only.

£10.00 + 50p P&P + VAT

★ **SIDESWIPE** Allows you to save Sideways ROM onto disc and load Sideways ROMS from disc into RAM.

£10.00 + 50p P&P + VAT

★ **TURBOPROM - 1-2** Uses a fast programming algorithm to greatly reduce programming time of EPROMS (14 mins = 2 mins). Used with Autoprom available on disc or Sideways ROM.

£15.00 + 50p P&P + VAT

NEW **CUSTOM RAM/ROM WRITER** Utility to produce a ROM image for AUTOPROM or SIDEWISE RAM to automatically download and run a BASIC programme, and/or your utilities on power up. Several utilities supplied with this package. Please specify 40T, 80T, disk or cassette.

£14.95 + 50p P&P + VAT

★ **DISC INDEX PROGRAM** Allows you to generate a data base of disc directories stored on Sideways CMOS RAM (Compatible with Acorn DFS only).

£10.00 + 50p P&P + VAT

★ **INDEX UTILITY ROM**

Index Utility has been written to help utilize the ATPL SIDEWISE board to its fullest extent.

Features supported include:

- ★ Paged ROM/RAM control.
- ★ Memory eraser.
- ★ Disc utilities. Plus many more, including features to make the use of a 6502 Second Processor less tiresome.

Command examples are:

- ★ Disc free space per drive.
- ★ Dump text window to printer.
- ★ Erase; Memory in specified area, ROM control switch and tube memory.
- ★ Display low memory areas.
- ★ Load menu.
- ★ Switch NFS off.
- ★ Manipulate read/write on ROM 15.
- ★ ROM display.
- ★ ROM switch on/off copy.
- ★ Search facilities.

As can be seen from just a few of the many commands this ROM is a useful addition to the SIDEWISE ROM board.

FOR ONLY £24.95 + 50p P&P + VAT

INSIDEOUT

INSIDEOUT is designed to make a sideways ROM socket available outside the BBC computer, to allow for easy exchange of sideways ROM's.

- ★ Can be used from BBC model B or expansion board sockets
- ★ Supplied with low insertion force socket for ease of use no costly cartridge packing.
- ★ EPROM plug in and go.
- ★ Not limited to one device.
- ★ Socket rated at 100's of insertions mounted outside the BBC. Easily removed and refitted.
- ★ Can be mounted in user defined location — not fitting in an illegal position.

ONLY £13.00 + 50p P&P + VAT

DEALERS ENQUIRIES WELCOME ON ALL OUR PRODUCTS –PLEASE CALL

WE OFFER A DESIGN DEVELOPMENT AND MANUFACTURING SERVICE

SYMPHONY

The Acorn Music 500 Compatable Electronic Keyboard. The Symphony Electronic Keyboard provides simulation of a wide range of musical instruments and sound effects through the BBC Micro or the Acorn Music 500.

£105.70 + £3.50 P&P + VAT

OPTIONAL EXTRAS

SYMKIT-Allows sound output from the BBC to be connected to an external amplifier.

£5.89 + 50p P&P + VAT

SYMAMP-Wooden cased amplifier with 6 Watt output suitable for use with the Symphony keyboard or Acorn Music 500.

£39.50 + £2.50 P&P + VAT

SYMSWITCH-Sustain foot switch for use with the Symphony keyboard.

£6.95 + £1.00 P&P + VAT

SYM 500-Software to allow music to be played through Acorn Music 500 via the Symphony keyboard - Now includes sequencing.

£14.95 + 50p P&P + VAT

Demonstrations of Symphony can now be seen at the following places.

Technomatic, 15-17 Burnley Road,
London NW10 1ED.

Electronequip, 59 West Street,
Fareham, Hampshire CO16 0JW.

The Data Store, Chatterton Road,
Bromley, Kent.

Cardiff Micro, 46 Charles Street,
Cardiff CF1 1EE.

COLOUR-STICK

An advanced light pen package for the BBC Computer, with disc based art program, Icon driven.

- ★ Comprehensive manual and software including two games, Solitaire and Pontoon.
- ★ Drawing facilities include; Multi point rubber banding, 4 colour shapes for circles, squares, rectangles, elipses, arcs, and sectors at any angle and size.
- ★ Drag drawing, and air brush facilities with unique area washing.
- ★ Colour fill in any of 4 solid colours and a choice from 120 textured colours.
- ★ Screen printer dumps to Epson printer.
- ★ Utilities to provide users with light pen routines.
- ★ Fits to analogue port and needs 40 or 80 track disc drive.
- ★ Text can be entered in various sizes, fonts and colours.
- ★ Save and load screens to and from disc.
- ★ Please state 40 or 80 track disc.

£39.50 + £1.00 P&P + VAT

CAD SYSTEM

Robo systems professional CAD for Apple, BBC, and IBM computers

- ★ 10,000 users worldwide, rapidly becoming the standard CAD System at a realistic price.
- ★ Auto dimensioning adjustable curves, precision grids and angle locks, powerful zoom and pan, scale drawing and text, and graphics library index.
- ★ Supports a wide variety of plotters from A4 to A0.
- ★ Ideal tool for:- Electrical/electronic engineers, chemical engineers, planning engineers, architects, education establishments, and PCB design.

ATPL have been appointed distributors for Robo products. We are currently looking for dealers, very attractive discounts available, please apply.

CAD systems start at **£795.00**

Please contact sales office for demonstration or quotation.

BREAK LOCK

EVER HIT YOUR 'BREAK' KEY WHEN YOU DIDN'T MEAN TO?

FOR THE BBC MICRO

Fit ATPL 'BREAK LOCK' to your BBC Micro and avoid disaster where inadvertant use of 'BREAK' will cause loss of data and/or programmes. ATPL 'BREAK LOCK' is a 2 position key-switch that will:

- ★ Prevent accidental or unauthorised use of the 'BREAK' key.
- ★ Act as a security device to prevent unauthorised use of your system more effectively and cheaper than security ROMs.
- ★ Easily and neatly fit in the 'Ash-tray'.
- ★ Render demonstration machines tamper-proof.

£8.53 + 50p P&P + VAT

AUTOPROM

Professional EPROM Programmer for the BBC computer and Acorn type Systems.

- ★ Capable of programming all 27 series EPROMS up to 27256 and most 25 series EPROMS.
- ★ Tape or disc based software, including fast program algorithm (27128 in 2 mins) and comprehensive manual.
- ★ Unique facility to run users own basic or machine code programs at Switch on or Reset.

£98.00 + £2.00 P&P + VAT

CONDITIONS OF SALE & DELIVERY

Cheques made payable to Advanced Technology Products Ltd please allow 28 days for delivery Cost of carriage or postage refer to each section. Quantity orders and overseas carriage charged at cost. Condition of sales available on request.

ACCESS/VISA accepted. Carriage to be added to advertised price, then add VAT to the total. In accordance with our policy of progressive development, we reserve the right to modify specifications without prior notice.

THIS MONTH'S SUPER SAVERS

GENERAL

Cables	POA
Disk Boxes (10 5.25")	£1.95
Disk Boxes (50 5.25")	£18
5.25" Head Cleaning Kit	£12
Disks (10 5.25") From	£13.50

DAISY WHEEL PRINTERS

Brother HR 15	£339
Brother HR 25	£649
Brother HR 35 (Serial or Parallel)	£749
Epson DX 100 (Serial)	£319
Epson DX 100 (Parallel)	£309
Qume Letterpro 20 (Centronics)	£575

DOT MATRIX PRINTERS

Brother Twinwriter 5	£1175
Epson FX 85	£339
Epson FX 105	£439
Epson LQ 1500	£655
Epson LX 80	£199
Epson JX 80 (7 Colour)	£425

DOT MATRIX PRINTER ACCESSORIES

Brother Twinwriter Tractor	£95
Brother Twinwriter Sheet Feed	£255
Epson FX 85 Cut Sheet Feed	£115
Epson FX 105 Cut Sheet Feed	£135
Epson LQ 1500 Tractor Feed	£49
Epson LQ 1500 2 Bin Sheet Feed	£435

EPSON RX 100+ ... £249

List price £309

With 15.5" carriage, this printer will take A3 paper, and print 233 characters per line in condensed mode.

FINGER PRINT £24

Epson MX, FX80, RX, FX100

FINGER PRINT

FINGER PRINT turns an ordinary Epson MX, FX & RX model into a more versatile, harder working, problem solving match for your computer!

This plug-in module for your Epson printer puts up to 10 special print functions at your fingertips.

TRIUMPH ADLER

TRD7020 .... £250

Serial or Parallel Daisy Wheel Printer

A 20 CPS Daisy Wheel Printer at an amazing 50% off list price.

A complete catalogue is available with details of

PRINTERS & ACCESSORIES
PLOTTERS & ACCESSORIES
MODEMS
APPLE II & MAC HARDWARE
APPLE II & MAC SOFTWARE

ALSO AVAILABLE:

EX-DEMO STOCK AT UNBEATABLE PRICES

MONITORS

Kaga 12" Green Monitor	£109
Kaga 12" Amber Monitor	£114
Zenith 12" Green Monitor	£80
Zenith 12" Amber Monitor	£95
Zenith Tilt Base	£14

DAISY WHEEL PRINTER ACCESSORIES

Brother HR 15 Sheet Feed	£192
Brother HR 25/35 Sheet Feed	£192
Epson DX 100 Tractor Feed	£77
Epson DX 100 Sheet Feed	£192
Qume Letterpro 20 Tractor	£155
Qume Letterpro 20 Paper Guide	£17

PRINTSHARERS

RS232 1/2	£69
RS232 1/3	£79
Centronics 1/2	£89
Centronics 1/3	£110

Please add £5 for P+P and 15% VAT to Total

RCS Ltd
132 Evelyn Crescent
Sunbury-on-Thames
Middlesex TW16 6NA

0932 761815

Mail Order Only

SALVATION'S AT HAND FOR A DEAD MOUSE...

MIKE COOK shows how to convert track balls to AMX standard in Part 39 of his course

IT is very rare in the computer business that a standard is agreed upon. What usually happens is that equipment manufacturers go their own sweet incompatible ways until one manufacturer is more successful than the others and comes to dominate the market.

This creates a de-facto standard which attracts all the attention and quality software. Rivals then produce compatible hardware and the market settles down.

This happened with printers. First the way of transferring data from the computer to the printer was standardised by the most successful printer manufacturer at the time, namely Centronics.

Then, as they became more sophisticated and were able to produce more than just a simple type face, the printer command system adopted was Epson's.

The same thing is happening today concerning the latest computer peripheral, the mouse. The BBC Micro market is dominated by the AMX. It has all the best software, much of which is available separately from the little hardware rodent and therefore it has set a de-facto standard.

However this is of little comfort to those who have invested in some other form of input device. Nevertheless salvation is at hand for those of you who have dead mice or, as the manufacturers call them, track balls.

A track ball is simply a mouse on its back. The ball is moved directly instead of moving the whole box. This has the advantage of using less desk room than the mouse and it also imparts a totally different feel to the graphical input device.

Some people prefer the feel of a track ball to a mouse, others don't. However in order to give you the choice I will look at ways of converting various track balls to the AMX standard.

Track balls that are suitable for conversion are those that plug into the user port. There is a type that plugs directly into the analog input port and simulates a joystick, but this is unsuitable for mouse conversion because the motion of the ball is translated into electrical resistance.

Most track balls and mice work by translating the motion of the ball into rotation of slotted discs which are then used to interrupt a light beam. As the disc rotates the beam is interrupted and produces a series of pulses at a light detector. The principles of this system are shown in Figure I.

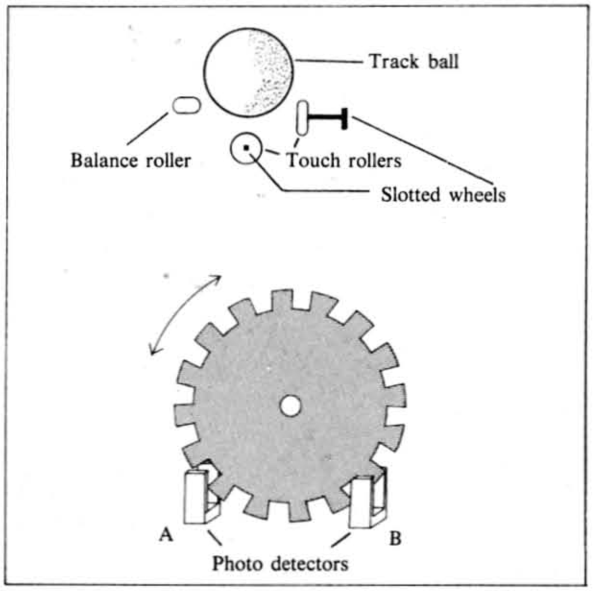


Figure I: Principles of a mouse/trackball

In order to tell in which direction the disc is rotating we need to use two detectors. These are arranged so that the slots do not pass the detectors at the same time, instead there is a stagger. You can see what I mean if you look at Figure II.

Detector A is uncovered just before B when the movement is clockwise but B is uncovered before A when the movement is anti-clockwise. This means that the pulses coming from detector A are out of phase with those coming from detector B.

In the jargon we say that the two signals are out of phase by 90°. This is because we view one cycle of a waveform as being equivalent to one cycle of rotation. As a whole cycle of rotation is 360° one quarter of a cycle is 90°. You can see the two signals produced in Figure III.

If we take one signal as our standard we can say the other signal lags by 90° for clockwise rotation and leads by 90° for anti-clockwise rotation. So in order

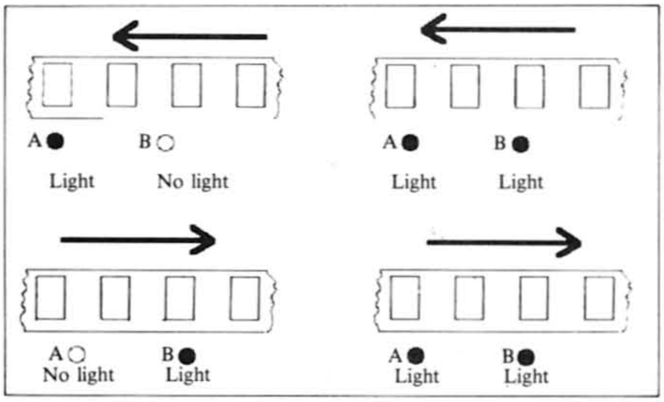

A● B○
Light No light
A● B●
Light Light
A○ B●
No light Light
A● B●
Light Light

Figure II: Direction detection

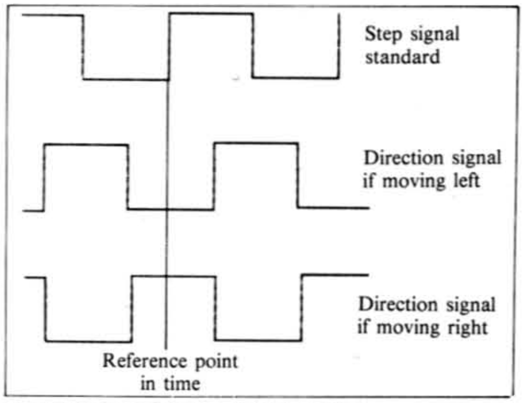

Step signal standard
Direction signal if moving left
Direction signal if moving right
Reference point in time

Figure III: Signals produced by movement

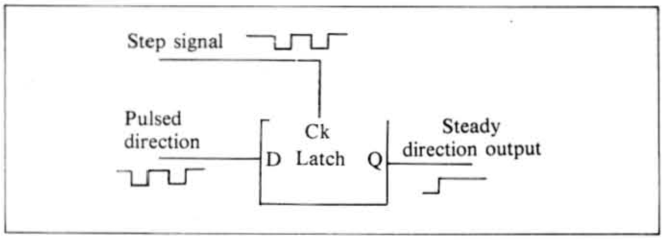

Step signal
Pulsed direction
Ck
D Latch Q
Steady direction output

Figure IV: A hardware direction detector

to see which way our mouse is going we determine whether we have a lagging or leading signal.

We can do this in hardware and this is the approach taken in the Atari track ball. If we use one signal to trigger a latch on its rising edge we can sample the other signal with the latch. Thus the output of the latch will always be high or low depending upon the direction of motion. This is shown in Figure IV.

A latch by the way is a circuit that takes a snapshot of a logic line. When it is triggered by a transition from logic zero to logic one on its clock input, whatever logic level is on its data input at the instant is transferred to its output.

Outputs of latches are inevitably labelled Q, for no adequately explained reason. The outputs produced by such an arrangement give you a step – movement has taken place – and a direction signal.

In the February 1985 edition of *The Micro User* we saw how this arrangement could be used by software to determine a cursor position, and in January 1985 we saw how it could be used to simulate a variable resistance type joystick.

Well I thought that to use an Atari trackball with the AMX mouse system I would have to design a circuit to recreate the out-of-phase signals from the step and direction signals. I duly did this but, fortunately before I built the prototype, I realised that it was simply unnecessary.

You see, what the software has to do with the two signals is very similar to what the hardware latch does. What happens is that on the rising edge of the reference signal an interrupt is generated.

The interrupt service routine then looks at the other signal at that instant to find out in which direction the mouse is going. Therefore it does not matter that the direction signal is not pulsing as it is only sampled at the instant the step signal makes a transition.

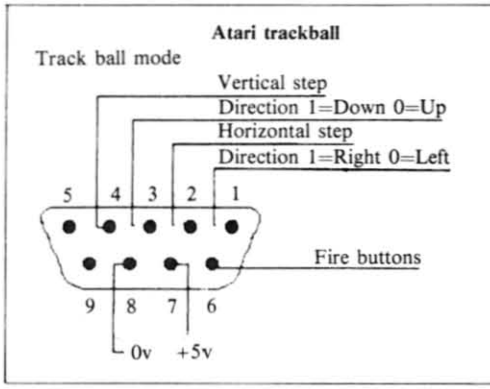
This means that the signals should be directly compatible if we can get them from the trackball into the user port on the same pins as those used by the AMX mouse.

Well, it turns out not to be quite that simple as the direction signal for left to right movement from the trackball is the inverse of that needed by the AMX software. This is simply remedied by inverting the direction signal with a transistor.

Finally the AMX mouse has three push buttons and the trackball only one. Actually it has two but they are wired together inside to act as one. You could rewire the inside, but that would be messy.

The simple solution is to provide three extra push buttons. Figure V shows the pinout of the AMX mouse

→


Atari trackball
Track ball mode
Vertical step
Direction 1=Down 0=Up
Horizontal step
Direction 1=Right 0=Left
5
4
3
2
1
Fire buttons
9
8
7
6
0v
+5v

AMX mouse

User port	*AMX signal*
CB1	Horizontal step
CB2	Vertical step
D0	Horizontal direction
D1	Unused
D2	Vertical direction
D3	Unused
D4	Unused
D5	Left button
D6	Centre button
D7	Right button

Figure V: Pinout of trackball and mouse

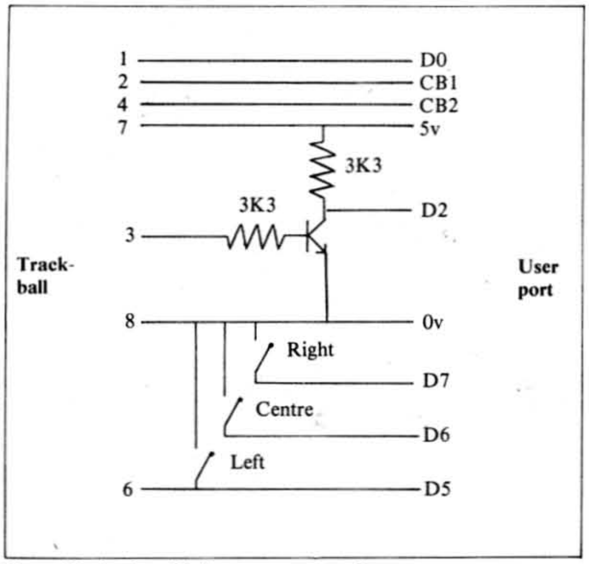


Figure VI: Atari trackball to user port interface

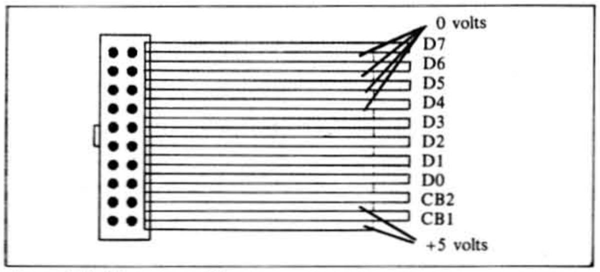


Figure VII: User port cable

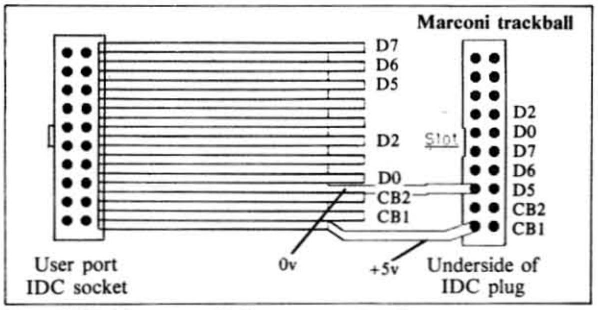


Figure VIII: Marconi trackball to user port interface

From Page 117

and the Atari trackball, and Figure VI shows the complete interface circuit.

I did consider laying out a printed circuit board for the interface with plugs and sockets, but when I priced it up it was just too expensive for what it was. Therefore the best solution is to make one out of plugs and wires.

Take a 20 way IDC – insulation displacement connector – and attach it to a length of ribbon cable by squeezing it together in a vice. You should make sure that the bump on the socket is pointing down the length of the cable when you crimp the two together so that when you wrap the cable around the strain relief clip the bump points away from the cable.

In this way when you lay it on the bench with the holes in the socket pointing upwards your cable will correspond to the diagram in Figure VII. Now take the other end of the cable and separate the strands, using Figure VII to identify the wires.

Note that there are two wires carrying +5V and eight carrying 0V and you only need to use one of each. Then wire them up to a 9 way D-type plug and a small piece of vero board containing the switches and the transistor. If you like, the switches may be mounted in a box. You can make the track ball switch act as any one you like simply by wiring pin 6 across it. In Figure VI this is shown going to the most used AMX mouse button – the one on the left.

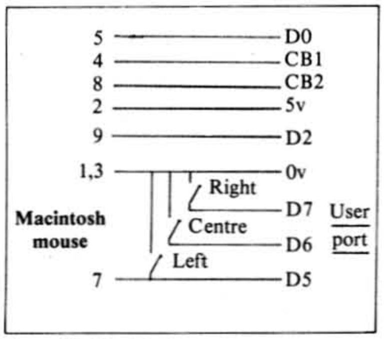


Figure IX: Macintosh mouse to user port

There is another make of trackball on the market by Marconi that has three buttons and plugs into the user port. This is electrically compatible with the AMX mouse, the only difference is that the signals are on the wrong pins.

Figure VIII shows the connections you need to make to allow AMX software to be used with the Marconi trackball. This is best made by taking an IDC socket and ribbon cable as before, only this time wiring it up to an IDC header plug.

Note the diagram shows the view of the underside of the header plug with the slot for the polarising bump on the left hand side. When you have finished the wiring and tested it, the exposed pins can be covered with silicon rubber, the type sold for sealing baths.

Finally the Apple Macintosh computer comes with a mouse and that can be converted to the AMX standard in a similar way as the Atari track ball. There is no need to invert the direction line as the signals are compatible. However you do need to add the extra mouse buttons as it only has one at present. The circuit needed is shown in Figure IX.

All the components to construct these interfaces are available as Body Build Pack 33. These packs are also available ready assembled for those of a less dexterous nature. Note that the extra switches can be mounted in a box, but are provided assembled on a strip of vero board.

So it is possible, if not for the mouse to come to the ball, then at least for the ball to come to the mouse. This will allow you to use your existing equipment with the new software without mutilating the plug and so making it unusable for its original purpose.

Body Build Pack 33: Pack 33a Atari to user port. 1 off 20 way IDC socket; 1 length 20 way ribbon cable; 1 length veroboard; 3 push switches and tops; 1 9 pin D-type plug; 1 transistor; 2 resistors; kit price £10; assembled £15.
Pack 33b Marconi to user port. 1 off 20 way IDC socket; 1 length of 20 way ribbon cable; 1 20 way IDC plug; kit £5; assembled £10.
Pack 33c Macintosh Mouse to user port. Same as pack 33a without transistor or resistors; kit £9.50; assembled £14.50.
All prices include P&P and VAT.

Order from: Musbury Consultants, 8 Fairhills, Rossendale, Lancashire.

KOSMOS
S O F T W A R E

The ANSWER BACK QUIZ Series (BBC and Electron)

ANSWER BACK – JUNIOR (£9.95 cassette, £10.95 disc)
An enormous collection of general knowledge quizzes and a superb fairy-tale game for the 6-11 year olds.

ANSWER BACK – SENIOR (£9.95 Cassette, £10.95 disc)
A space game and a gigantic collection of general knowledge quizzes. Ages 12-Adult.

ANSWER BACK – SPORT (£9.95 Cassette, £10.95 disc)
Two sports games and a massive series of quizzes on all the popular sports. Ages 14-Adult.

ANSWER BACK Program Features:

- Unlimited quiz creation, editing and saving facilities. (No knowledge of programming required).
- Multiple choice, True-False? and complete-the-answer modes.
- Immediate display of mistakes; performance summary and optional re-run of questions incorrectly answered.
- Correct answers gain further turns in the compelling games.

The FACTFILE 500 Series (BBC and Electron)

Each pack contains a supplementary database of 500 questions and 2000 multiple choice answers for use with the above ANSWER BACK programs. The modules have been compiled by teachers, experts and specialists.

NATURAL HISTORY	**(Ages 10+)**	£3.95 Cassette, £5.45 disc
ARITHMETIC	**(Ages 6-11)**	£3.95 Cassette, £5.45 disc
SPELLING	**(Ages 8-12)**	£3.95 Cassette, £5.45 disc
ENGLISH WORDS	**(Ages 12+)**	£3.95 Cassette, £5.45 disc
KNOW ENGLAND	**(Ages 12+)**	£3.95 Cassette, £5.45 disc
KNOW SCOTLAND	**(Ages 12+)**	£3.95 Cassette, £5.45 disc
FIRST AID	**(Ages 13+)**	£3.95 Cassette, £5.45 disc
GENERAL SCIENCE	**(Ages 14+)**	£3.95 Cassette, £5.45 disc
SUPER SPORTS	**(Ages 14+)**	£3.95 Cassette, £5.45 disc

All prices include VAT, P&P and 24-hour despatch.
Send cheque, PO, ACCESS number or an official order.
Detailed catalogue available on request.

KOSMOS SOFTWARE LIMITED
FREEPOST, DUNSTABLE, BEDS LU5 6BR. Tel: 05255 3942

The 1st choice

EXPRESS BBC REPAIRS!

BBC repairs between £14 and £45.

WHY PAY HIGH 'FIXED' PRICES

(We do not charge you for our fancy premises by charging high 'fixed' prices!)

Reputations take time to build, we have been repairing ZX 81's, Spectrums, QL's, Apples and BBC's professionally, for 2½ years – who is coming second?

B+ (64K) UPGRADE KIT
– CONTACT FOR DETAILS.

FOR PROFESSIONALISM – "Of all the repair companies 'Sinclair User' spoke to, **MANCOMP** seemed the MOST PROFESSIONAL when it came to advice and a helpful attitude" AUG 85.

FOR HONESTY – We let you watch your computer being repaired and if there is nothing wrong with it, we will tell you!!!

FOR REPUTATION & HELPFULNESS – "I have come across a firm that will be more than willing to advise you as to how to remedy your problems. They are called **MANCOMP** and as well as repairing faulty computers, are also quite willing to discuss your problems with you and offer reasonably cheap and more importantly CORRECT CURES" Phil Rogers POPULAR COMPUTING WEEKLY JAN 85.

Every parcel sent by Royal Mail Receipted Post and insured for return journey!
(For next day delivery include £1.50 extra).
(Securicor by prior arrangement).
On-site maintenance for Apples, I.B.M.'s and most makes of printers also available.
Guaranteed 4hr response!

WHY DELAY – OUR ESTIMATES ARE FREE AND WITHOUT OBLIGATION. IF YOU DO NOT LIKE OUR ESTIMATE 'WE WILL RETURN THE COMPUTER **AND** REFUND THE POSTAGE INCURRED!

MANCOMP LTD
(Dept. MU7)
Printworks Lane, Levenshulme.
Manchester M19 3JP
Phone 061-224 1888.
OR 061-224 9888.
OPEN MON - SAT 9am to 7pm

EXTRA-SPECIAL DISCOUNTS FOR EDUC INST., H.M. FORCES, CHARITIES, HOSPITALS, ETC!

Hardware and software design probems? Contact us for the complete service, from design through to manufacture.

What we do today . . .
others do tomorrow!

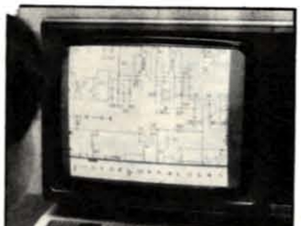
NOTE OUR PRICES AND WATCH OTHERS FOLLOW THE LEADER

PINEAPPLE SOFTWARE

Programs for the BBC model 'B' with disc drive with FREE updating service on all software

ARE YOU GETTING THE MOST FROM YOUR DOT MATRIX PRINTER AND DISC DRIVE?

DIAGRAM is a new program which really exploits the full potential of the BBC micro and will enable you to obtain printouts of a size and quality previously unobtainable from your system.



Originally designed for producing large circuit diagrams, DIAGRAM has now been improved to the point where it is invaluable for anyone who wishes to produce large areas of mixed graphics and text, and has many of the features normally found only in very expensive text/graphics processors.
DIAGRAM utilises a unique method of storing information on disc which allows not only very large diagrams to be created, but also allows rapid 'scrolling' of the screen both horizontally and vertically over the full area of the diagram.
The hard copy printout options available with DIAGRAM are second to none, and use is again made of the unique disc storage techniques to produce both horizontal and vertical printouts in various sizes down to probably the smallest high definition printing you have ever seen from your printer – a full 3 ★6 (18 mode 0 screen) diagram printed in a single print run onto an A4 sheet!

FEATURES

- Diagrams may consist of up to 39 mode 0 screens, defined in any aspect ratio, e.g. 3 screens across by 13 screens down, 10 screens 3 screens etc.
- Up to 128 Icons may be used by any one diagram, and may be predefined in full mode 0 definition with a maximum size of 32 × 24 pixels. An unlimited size library of Icons may be built up allowing rapid transfer of Icons from the library to a new diagram.
- Editing of diagrams can be achieved at any time during 'scrolling' around the screen, and edit features include - Comprehensive horizontal and vertical line drawing routines with automatic 'perfect joins' at corners and T junctions. Entry of text characters and Icons at any time by a single key press. Also, any size rectangular area of the screen may be predefined, and this area may then be deleted, moved anywhere on the screen, or copied to a different point on the screen.
- Other features include selectable display colours, TAB settings, Index names, and many more.
- Diagram is compatible with most dot matrix printers (specify type when ordering), and printouts can be obtained of any specified section of the diagram, in varying sizes and in either horizontal or vertical print mode. With an FX80 type printer up to three screens may be printed across the width of the carriage, and there is no limitation (apart from the diagram size) to the number of screens that can be printed in the vertical direction – up to six mode 0 screens will fit vertically on an A4 sheet.
- The latest version of DIAGRAM is now fully compatible with Marconi Tracker Ball, which allows 'scrolling' of the screen and many of the editing features to be carried out using the tracker ball.
- DIAGRAM is supplied in an attractive hard backed disc wallet with keystrip and comprehensive instruction manual.

DIAGRAM SOFTWARE
£25
PLUS VAT P&P FREE
Supplied only on disc. Please specify printer type and 40/80T disc when ordering.

MARCONI TRACKER BALL
£60
PLUS VAT P&P £1.75
Includes Icon Artmaster Software

MARCONI TRACKER BALL AND ICON ARTMASTER PLUS DIAGRAM SOFTWARE
£76.50
PLUS VAT P&P £1.75

All orders sent by return of post

Many of our customers have said they think that DIAGRAM is worth twice the price, so order now before we put the price up!

39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL. ☎ Tel: 01-599 1476.

Use your micro to speed up your mail . .

1 POSTAGE PAID GREAT BRITAIN PHO 413
Telemessage

and next-day delivery is guaranteed!

Everyone knows that "first class" mail is far from perfect. The Consumers' Association reported in June that two out of every five first class letters fail to be delivered the day after they are posted.

So if you have an urgent letter that just HAS to be delivered tomorrow, what do you do?

If you have a home or business computer the answer is at your fingertips.

You compose the letter on your computer. Then, in a simple operation that takes only a few seconds, you send it down the telephone line to MicroLink, the electronic mail service operated in association with Telecom Gold.

That's the end of your part in the story. From now on electronics take over. Your letter is fed automatically into the national British Telecom Telemessage service. It's switched to the delivery office nearest the recipient's address, where it's printed out on a letter-quality printer and put into a distinctive yellow envelope. And providing it was sent any time up to 8pm, it is delivered by the local postman by breakfast time the next day. Exactly as you'd typed it out the day before.

And how much does this ultra-fast service cost? From just £1.45 to send a letter of up to 350 words to any address in the UK (and an extra £1.70 to any address in the USA). You can also have it accompanied by a colourful greetings card (choose from 16 different varieties) for another 75p.

Telemessages is just one of many services offered by MicroLink that are designed to speed up communications. Find out more by returning the coupon below.

Please send me more information about your speedy Telemessage service and other aspects of MicroLink.

Name ______________________________

Address ______________________________

____

MicroLink
In association with
TELECOM GOLD

Send to: MicroLink,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

LOGIC SALES LTD.

Title	Price	Title	Price
Football Manager*	6.95	Twin Kingdom Valley**	3.50
Micro Olympics**	3.95	Mini Office II* (cas)	12.95
DBL Phanton Combat*	17.95	Mini Office II* (disc)	14.95
Combat Lynx**	6.95	Commando**	7.95
Contraption*	6.95	Hypersports* (disc)	12.95
Yie Arh Kung Fu** (cas)	6.95	Moon Cresta*	6.95
Yie Arh Kung Fu* (disc)	12.95	Scrabble*	10.95
Island Logic Music System		Bugeyes II**	7.95
Cass.*	12.95	Red Moon*	4.95
Cass.* 2	12.95	Return to Eden*	4.95
Disc*	26.95	Blockbusters**	5.95
Lord of the Rings* (cas)	12.95	Strike Force Harrier** (cas)	7.95
Lord of the Rings* (disc)	14.95	Strike Force Harrier* (disc)	9.95
Matchday*	7.95	Repton**	7.95
Citadel**	7.95	Deathstar**	7.95
Speech* (Disc)	10.95	Speech* (cas)	7.95

SUPER SAVERS ALL UNDER £4

Chess**	2.50	Cosmic Cruiser*	2.50
Frenzy**	2.50	Jet Pac*	2.50
Rubble Trouble**	2.50	Ten Little Indians*	2.50
Moonraider*	2.50	Castle Blackstar*	2.50
Felix and the Fruit Monsters**	2.50	Stolen Lamp**	2.50
Felix and the Evil Weevils*	2.50	Gremlins**	3.95
Daredevil Dennis*	2.50	Battlezone 2000**	2.50
Demolator*	2.50	Bismark*	2.50
Pengi*	2.50	Roman Empire**	2.50
Swoop*	2.50	Empire**	2.50

* = BBC. ** = Electron

Large range of educational software. Please send self addressed envelope for list. Prices from £2.50

Acornsoft titles for Electron £2.50 each:
Snapper, Boxer, Turtle Graphics, Planatoid, Tree of Knowledge, Business Games, Desk Diary, Lisp, Forth, Castle of Riddles, Freefall, Talkback, Workshop, Hopper, Chess.

ALL PRICES INCLUDE VAT, PLEASE ADD 60p POSTAGE

LOGIC SALES LTD.
19 The Broadway, The Bourne,
Southgate, London N14 6PH.

24hr. Order Line 01-882 4942 ACCESS & VISA CARDS WELCOME.

COMLEX

Unit 7, Fife St., Nuneaton, Warks. CV11 5PR.
Tel: 0203 371371 Mon-Fri. 9am-5.30pm.

COMPUTERS

BBC Master	£449.00
Amstrad 6128 Green	£285.00
Amstrad 6128 Colour	£385.00
Amstrad PCW 8256	£449.00
Atari 520ST	£699.00
Olivetti – M24, 24 mB Hard Disc (Seagate) MSDOS, Green Monitor, Keyboard	£1,850 + VAT
Tandon 256K + 10mB Winchester + Monitor (IBM compatible)	£1595.00
Sperry PC 20 mB Hard Disc (Seagate) MSDOS, Green Monitor, Keyboard	£1,995 + VAT

DISC DRIVES

OPUS	
5401 + DDOS	£99.00
5402 + DDOS	£159.00
802 40/80 track	£119.00
5802SD	£149.00
5802D	£259.00
Challenger 256K	£199.00
Challenger 512K	£229.00
DDFS	£45.00

MONITORS

Microvitec 1431	£199.00
Microvitec 1451	£259.00
Microvitec 1441	£389.00
Microvitec 1431AP	£209.00
Microvitec 1451AP	£289.00
Philips 7502 green	£79.00
Philips 7522 amber	£85.00
Philips TV/Monitor	£199.00
Philips CM8501	£199.00
Philips CM8533	£279.00

EPROMS

27128	£2.60
2764	£1.80
8271	£35.00
8256	£5.60

MODEMS

Pace (with Commstar)	£149.00
WS2000	£129.00
AMX Mouse	£74.95

PRINTERS

Mannesmann Tally MT80	£189.00
Epson LX80	£215.00
Epson GX80	£245.00
Interface for GX80	£50.00
Epson FX85	£359.00
Epson FX105	£479.00
Epson RX100	£259.00
Epson JX80	£499.00
Epson LQ1500	£819.00
Cannon 1080A	£235.00
Cannon 1156A	£379.00
Okimate 820 Colour	£259.00
Juki 5510	£279.00

Special Offer

Kaga Taxan (inc cable + paper)	£249.00

BROTHER PRINTERS

HR5	£147.00
HR15	£373.00
HR25	£725.00
HR35	£799.00
M1009	£177.00
EP44	£211.00
2024	£895.00

DAISYWHEEL

Juki 6000	£209.00
Juki 6100	£359.00
Juki 6300	£899.00
Epson DX100	£379.00
QuenData	£169.00
Silver Reed 770	£834.00
Cut Sheet Feeder for 550 and 770	£230.00
Listing Paper (2000 sheets)	£15.00

• PHONE IF PRINTER NOT LISTED •

NOW ALSO AT:
MANCHESTER HOT-LINE
Tel: 061-976 3763
CALLERS BY APPOINTMENT ONLY
ALL PRICES INCLUDE VAT. Please add £5.00 Carriage.

MICROMAIL

£10 Prize letter

A way round graphics store limitations

IT is often the case that, when creating complex screens, the program which does the drawing is too large to permit the use of the highest definition mode.

This typically happens with the Hershey Characters package from Beebugsoft which seems to necessitate the use of Mode 4 where Mode 0 would be better.

*One solution to this problem is to insert *SPOOL PLOTS after the line selecting the low definition mode, and to insert *SPOOL at the point the drawing is completed.*

The effect of this will be to save a trace of the PLOT commands on file. A quick look at the picture in high definition may then be taken by typing MODE 0:EXEC PLOTS, but a better arrangement is to run the following program.

```
10 A%=OPENIN"PLOTS"
20 MODE 0
30 REPEAT
40 VDU BGET#A%
50 UNTIL EOF#A%
60 CLOSE #A%
70 A%=GET
80 END
```

*Line 70 could be replaced with a call to a screen printing routine or a *SAVE command to save the screen to file.*

However in many cases it may be found that the spool file is a more compact representation of the screen than the save file.

I hope you will be able to publish this hint as I am sure many of your readers, like me, have found the store limitations a particular problem with many graphics programs. – **M.J. Pickett, Twyford.**

Take a tip, Dr Who

HERE are some tips for Dr Who and the Mines of Terror by Micropower.

First some general tips – Sphinx has to be carried up ladders and the robots cannot go up ladders, so when pursued find a ladder quickly.

On jumps which seem impossible – for example, when getting the oxygen from the Mendroy – let yourself fall off the end for a fraction of a second before jumping!

Now here are some specific tips:

- *If you want to speed the game up in the areas which you move automatically – for example, the lift – pick up the spool found out in space, and drop it in the apparatus that suspends objects in air five floors up from the lift bottom and second right.*
- *To remove the dustbin lid objects you need to carry the electronic screwdriver.*
- *To get to the greenhouse – shown on blueprint – avoid the robot which is immediately on your right, on the sixth screen up.*
- *Keep Z and : depressed until the screen scrolls down to meet you. Then go right and up the ladder.*
- *The cloth found in the greenhouse disables robots if they run over it, but can only be used once.*
- *To enter one of the escape capsules which are to the left of the top left CSC unit, go up on the three ladders and before you reach the top jump off left.*
- *To escape press U when carrying the detonator – if you have it, drop it quickly and use the escape pad activator.*

Finally remember your score doubles every time you reach a CSC unit starting at 128 points. – **J Trevor, N. Lincs.**

Snap on the Master

BACK in 1984 I bought your Micro User Education Special volume 1. I have used all the programs extensively and found them all to be really good.

I recently got a BBC Master and find that the program Snap does not work properly.

It does run, but the graphics are all mixed up. Could you advise me how to alter it as it is our son's favourite? – **David Frankl, Burnham.**

● The problem is that the program reads the character definition directly from the ROM, and this definition is in a different place in the Master.

This happens with several large character routines, and it can be overcome by using Osword. If you change line 1210 and add the other lines as follows, Snap should work on any BBC Micro.

```
   1 PROCcode
1210 a1%=&81:?&80=c%:CALL START
2480 PROCcode
2490 a1%=&81:?&80=c%:CALL START
2500 DEFPROCcode
2510 DIM P% 50:START=P%
2520 [OPT0
2530 LDX£&80
2540 LDY£&00
2550 LDA£&0A
2560 JSR&FFF1
2570 RTS
2580 ]
2590 ENDPROC
```

Win a tenner

● *Want to write to* ***Micromail? The address is: Micromail, The Micro User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. Writers of the three most interesting letters will each receive a £10 prize.***

Rules for Wordwise Plus

USERS of View will be aware of the value of the rulers for the formatting of text.

When text is previewed in Wordwise Plus there is no such indication to show the extent of the paper, and it is often necessary to do a test printout to see the exact effect of margins and indents.

However by including OS"FX155,(col+48)" as an embedded command at the start of your document, where col equals the value of the foreground colours in Mode 2 – in other words 1=red, 2=green and so on – the text is previewed against a background of 80 narrow vertical lines.

It is a matter of opinion as to whether it makes the text any easier to read but it certainly aids the setting of margins, tabs and line lengths as the character positions can be counted.

Although values other than 48 can be used – 9,16 and 112 – 48 is chosen because the characters are centered on the vertical lines. – **Gary Crawford, Crawley Down, West Sussex.**

●This is certainly an aid to seeing how a document will be laid out.

I prefer OS"FX155,4" which gives blue lines at the left of the text.

Readers without Wordwise Plus can try this FX call directly in any mode except 7.

An interesting effect can be created in Mode 6 using VDU 19,0,4,0,0,3:*FX155,0.

JP101 screen dump

I GOT an Acorn/Olivetti JP 101 spark jet printer through a special offer in The Micro User *and am having difficulties in finding a program which will enable a screen to be dumped to the printer.*

Could anyone help me obtain a suitable program for the JP101 and BBC B and has anyone successfully written a screen dump program for converting a program from another printer? – **Paul Franklin, Leeds LS11.**

● We now have a screen dump for the JP101 from one of our regular writers. Hopefully it will appear in the magazine soon.

Time saver

HERE is a real time saver if you are about to type in the data on Cavern Quest (Micro User, *May 1985). Type in:*

**KEY0 DATA0*
**KEY1 DATA1*
**KEY2 DATA2*
**KEY3,0*
**KEY4,1*
**KEY5,2*

You press either of the first three keys for the start then tap out the other keys in succession to complete the line. – **Jack Alexander, Poynton.**

● This is a useful tip when you are typing in anything with a lot of repeated text.

NLQ printing

DO you know of a program compatible with Mini Office II that can provide NLQ printing on an Epson FX80? – **Mark Brown, Dereham, Norfolk.**

● Most NLQ ROMs should work with Mini Office II word processor if you include the star commands in the text as embedded commands.

We tried the Watford NLQ ROM and found it could be used with the spreadsheet and word processor.

With the spreadsheet the ROM should be enabled with either *NLQ80 or 100 and *NLQTYPE from the spreadsheet menu.

However if a printout is split over pages then a new page is not thrown correctly, giving 1 character of rubbish.

This can be disabled by *FX6,12. Before exiting to Mini Office main menu switch off the ROM with *NLQOFF.

The NLQ ROM works with the word processor very well. Insert *NLQ80 or 100 followed by *NLQTYPE at the start of the text and *NLQOFF at the end of text.

The alternative VDU codes 129 and 193 will work but give unpredictable results and are best avoided. The other codes for underline, proportional type and enlarged type all work.

It is important that the length of a line plus the length of any left margin is less than the NLQ line width setting – 80 or 100.

If it's equal to it then you get double line spacing and greater than that causes the line to overflow on to the next one down.

The word processor sends out two control characters at the start of a document. Hence two weird symbols are printed if NLQ is enabled. This won't

Writing to the CMOS RAM

£10 Prize letter

I WAS interested to read in The Micro User *that there are 10 bytes in the Master 128 CMOS RAM which are available for the user.*

*The Welcome guide only says that you can use *FX 162 to write to the CMOS RAM, so I started to experiment and discovered the following:*

● **FX 162,x,y does write the value of y to the byte x, where it seems that x can take any value 1 to 49 inclusive.*

● *Writing to bytes 18 to 49 does not seem to affect the start-up options.*

● **FX 161,x,1 can be used to read the values stored, where the value is returned in the y register – so you need a very short piece of machine code to get the value.*

*After accidentally resetting the CMOS RAM several times and needing to use either *CONFIGURE or the Panel program to reset the values I decided to write a program which would store my preferred values – including my own user bytes if necessary – and then reload them after any mishaps or battery replacement.*

The program reads the CMOS RAM and inserts them into new data lines 1001 to 1049 using the keyboard buffer.

When it has completed this it inserts a new line 5 so that if the program is saved the next time it is run it will insert the old values into the CMOS RAM.

If you want to set it up with an alternative set of values then delete the new line 5 and run it again while you have your new set of values in RAM. – **A.T. Torlesse, Romsey, Hants.**

```
   10 PROCassy
   20 N%=1000
   30 N%=N%+1: REM NEW LINE
 NO
   40 IF N%=1050 PROCnew:EN
D: REM ENDS ROUTINE AFTER B
YTE NO 49.
   50 A$=STR$(N%): REM INSE
RTS NEW LINE NO.
   60 PROCfillbuffer
   70 A$="DA. ": REM INSERT
S DATA.
   80 PROCfillbuffer
   90 X%=N%-1000: REM SETS
BYTE NO, INITIALLY 1.
  100 PROCread
  110 A$=STR$(?&70): REM GE
T NEXT BYTE
  120 PROCfillbuffer: REM A
ND INSERT IN KEYBOARD BUFFE
R.
  130 A$=CHR$13
  140 PROCfillbuffer
  150 A$="G.30"+CHR$13: REM
 INSERT GOTO 30.
  160 PROCfillbuffer
  170 END
  180 REM**************
  190 DEFPROCassy: REM ROUT
INE TO SET Y REGISTER INTO
&70 AFTER *FX CALL.
  200 FOR pass=0 TO 2 STEP
2
  210 P%=&71
  220 [OPT pass
  230 JSR &FFF4
  240 STY &70
  250 RTS
  260 ]
  270 NEXT
  280 ENDPROC
  290 REM**************
  300 DEFPROCread: REM GETS
 NEXT BYTE FROM CMOS RAM
  310 A%=161
  320 Y%=1
  330 CALL &71
  340 ENDPROC
  350 REM**************
  360 DEFPROCfillbuffer: RE
M FILLS KEYBOARD BUFFER WIT
H A$
  370 A%=153
  380 X%=0
  390 FORchar%=1 TO LEN(A$)
  400 Y%=ASC(MID$(A$,char%,
1))
  410 CALL &FFF4
  420 NEXT
  430 ENDPROC
  440 REM***************
  450 DEFPROCnew: REM WRITE
 NEW LINE 5 GOTO 500
  460 A$="5G.500"+CHR$13
  470 PROCfillbuffer
  480 ENDPROC
  490 REM *** START OF NEW
PROGRAM
  500 A%=162: REM PERFORM *
FX 162,X,Y TO LOAD DATA INT
O CMOS RAM LOCATIONS 1 TO 4
9
  510 FOR X%=1 TO 49
  520 READ Y%
  530 CALL &FFF4
  540 NEXT
```

occur if the NLQ commands are inserted in the text.

However if NLQOFF is missing or printing is abandoned mid way the two symbols will be printed next time unless a *NLQOFF is given from the word processor menu.

Room at the top

I AM having a problem trying to obtain one of the features of my Juki 6100 printer from within View.

With cut sheets I normally use the printer's automatic paper loading facility. This is very handy but loads the paper in such a way as to give a top margin of approximately six lines.

Since I can alter View's top margins and header to zero this is generally satisfactory, but there are occasions when I would like to print nearer to the top of the paper, retaining consistency with where I start and finish printing each page.

The printer can perform a negative line feed, but try as I might with Acornsoft's Printer Driver Generator – altering, for example, the extended character set – all I can do is obtain an ordinary line feed which is just the opposite of what I want. – **S. Gill, Halifax, West Yorkshire.**

● Are there any Juki 6100 owners out there who can help?

Swapping numbers

NO doubt many of your readers know how to interchange the numerical values stored in two variables – an important method in any sort routine.

Using Basic the coding would be something along the lines:

```
10 A=3
20 B=7
30 Dummy=A
40 A=B
50 B=Dummy
```

where A and B initially contain 3 and 7 respectively and are to be interchanged.

The variable Dummy is used as an intermediate store. When executed A will finally contain 7 and B will be holding 3.

You may be interested to know of at least two other methods which interchange variables but do not make use of a Dummy variable:

```
Method 1
10 A=3
20 B=7
30 A=A+B
40 B=A-B
50 A=A-B
Method 2
10 A=3
20 B=7
30 A=A*B
40 B=A/B
50 A=A/B
```

The methods however fail for values which have a wide variation in magnitude and contain a large number of figures. This is due to rounding errors. – **P.McDonald, Scunthorpe, South Humberside.**

● We have often seen people put A=B:B=A and then wonder why they obtained the wrong result.

It's pleasing to see that people are thinking of other ways around the old problem of swapping numbers.

USE THE CAPITAL CURE

£10 Prize letter

ONE of the problems people have when first introduced to computers is that most of them treat capitals and lower case as different characters.

I have come up with the small program below to rectify the problem on a BBC Micro.

After it has been run the computer does not mind whether you type in capitals, lower case or a mixture of both.

This means you can type in a program like this:

```
10 For Loop=1 to 20
20 Print Loop
30 Next loop
```

However, when you list it it will appear as follows:

```
10 FOR LOOP=1 TO 20
20 PRINT LOOP
30 NEXT LOOP
```

In other words the computer treats everything as capitals. A disadvantage of this is that you can no longer have Basic keywords as variables in lower case.

Anything in inverted commas will be treated normally. For instance, Print"Hello" will print Hello normally.

To overcome our variables problem anything enclosed in set brackets and will be printed out normally, so you could have:

```
10 {print}=10
20 Print {print}
```

These brackets will not be printed out while the program is listed. Deleting of these brackets will not work correctly, so take care.

The program works quite simply. It intercepts OSWORD 0, where most languages take their input from.

If anyone knows how to solve the deleting of {and} correctly I would be interested to hear. – **Julian Rockey, Shrewsbury, Shropshire.**

```
   10REM
   20REM
   30REM
   40*|
   50FORI%=0TO1:P%=&900:[OP
TI%*2
   60.intercept:PHP:CMP#0:B
EQinput:PLP:JMP(oldv):.inpu
t
   70PHA:TXA:PHA:CLI
   80STX&70:STY&71
   90LDY#0:LDA(&70),Y:STA&7
2:INY:LDA(&70),Y:STA&73
  100INY:LDA(&70),Y:STA&74:
INY:LDA(&70),Y:TAX:INY:LDA(
&70),Y:STA&71:STX&70
  110LDY#0:STY&75
  120.rep:JSR&FFE0
  130CMP#127:BEQdel
  140CMP#21:BEQdelln
  150CMP#13:BEQignore
  160CPY&74:BEQskipwr
  170.ignore
  180PHA:JSR&FFE3:PLA:.skip
wr
  190CMP#34:BEQinv:.inhere
  200CMP#123:BEQswitchoff
  210CMP#125:BEQswitchon
  220CMP#13:BEQret
  230CMP#27:BEQesc
  240CPY&74:BCCoklen:LDA#7:
JSR&FFEE:JMPrep:.oklen
  250LDX&75:BNEnotlet
  260CMP#97:BCCnotlet
  270CMP#123:BCSnotlet
  280AND#&DF:.notlet
  290CMP&70:BCCrep
  300CMP&71:BEQok:BCSrep
  310.ok
  320STA(&72),Y:iny
  330JMPrep
  340.ret:STA(&72),Y:INY
  350PLA:TAX:PLA:PLP:CLC:RT
S
  360.esc:PLA:TAX:PLA:PLP:S
EC:RTS
  370.del:TYA:BEQrep
  380LDA#127:JSR&FFEE:DEY:L
DA(&72),Y:CMP#34:BNErep:LDA
&75:EOR#1:STA&75:LDA#34:JMP
rep
  390.delln:TYA:BNEokdelln:
JMPrep:.okdelln
  400LDA#127:.delrep:JSR&FF
EE:DEY:BNEdelrep:JMPrep
  410.inv:LDA&75:EOR#1:STA&
75:LDA#34:JMPinhere
  420.switchoff:LDA#1:STA&7
5:JMPrep
  430.switchon:LDA#0:STA&75
:JMPrep
  440.oldv:EQUW0
  450]:NEXT
  460REM!&90=&A00:?&92=10:?
&93=32:?&94=255:X%=&90:Y%=0
:A%=0
  470?oldv=?&20C:oldv?1=&20
D
  480?&20C=0:?&20D=9
  490?oldv=?&20C:oldv?1=?&2
0D
```

Drastic remedy

I HAVE OS 1.20, Basic 1, Addcomm, Graphics extension and Wordwise plus.

When I type in a program beginning with the line numbers 1000, 1010, 1020 and so on, press Break, and do an OLD LIST the computer lists the program with the line numbers 232, 1010, 1020 and so on. – **R.J. Smallshire, Warley, West Midlands.**

● This is due to the way the BBC Micro works and nothing to do with your extra ROMs.

As Break is rather drastic it should be avoided and Escape used wherever possible.

Pressing Break appears to clear the program from memory. One of the things it does is to put 255 in memory location Page+1.

The line number 1000 is stored in hexadecimal notation as 3 in memory location Page+1 and 232 in location Page+2 (100=2×256+232), so on pressing Break the 3 is overwritten by the 255.

Old does its best to restore the program, but as it did not know what number was in Page+1 it puts 0, leaving the first line number as the lo byte only.

Cheating cheapens

I AM disgusted, infuriated and frustrated by your Elite Cheat program.

You have effectively destroyed the heart and soul of an ingenious and magnificent challenge.

A status reserved for the toughest, most dedicated, skilful and resourceful is now available to any old novice.

You have elevated unworthy cheats to a select group of dedicated and privileged expert combateers.

Ultimately you have made cheap the Elite rating and the game itself. To be Elite now means nothing as far as superior status is concerned.

Your efforts have erased the hard work of the truly Elite commanders. Maybe the game should be renamed Harmless Cheats. – **Nicholas Dorgu, Preston, Lancs.**

And finally, with tongue firmly in cheek . . .

Surviving the evening's workout

Dear Trev,

Sorry it's been so long since I've put pen to paper, but I honestly haven't had the energy. I never realised that pens weigh so much.

Wasn't it Dylan Thomas who wrote "Don't go gently in that good night" (as Roland, landlord of the Ram and Buffer is always quoting to persuade me to have one or two for the road?)

Well I want to go gently. I have no objection to old age and decrepitude creeping up on me. In fact after what I've just experienced I'd rather welcome it.

Of course the signs were there. How long has it been since I've seen my toes (and why should I want to? After all they're hardly my best feature). And I must admit that I've not been able to get as near the keyboard as I used to.

The most galling sign is that I haven't been able to hurl an empty Boddington's can as far as in former times, a fact which Buster has observed and made use of. I'll swear it's that cat that got my tape version of Elite (which does sound like the name of a cat food when you think of it).

It was Hilda from the Bellringers who really put the boot in. It was one of the Bellringers' monthly muesli tasting parties. She stood there resplendent in her "Pull the other one Thatcher" and "Bellringers do it standing up" badges, looking at me with the same sort of contempt that I reserve for Nigel's Electron.

"Your man needs something doing to him", she observed to A. in a frighteningly cutting voice. "Look at him, he makes a bean bag seem sleek".

Of course that was only one of the random factors. The other was the appearance of an advert in The Micro User *stating that, for a limited period only, Central Processors would be doing a special offer.*

The idea was that Beeb owners take their micro in for a service at a reduced rate and while it was being done they could have a test drive of the new Master 128.

It seemed like a good idea but it was a mistake to let Andrea pick it up for me. I should have realised something was up when she agreed to do it, saying that "You won't be able to carry it, will you?"

As soon as I got home from work I rushed upstairs to the back bedroom and there it was in all its glory. A BBC Master. Have you seen one of them yet? I know the adverts try to make them sound boring but they're really quite good fun. Except for this one.

You know that the Master (or Boss as I soon learnt to call it) can start up in any of the sideways ROMs? Well A. had seen to it that this one only had one sideways ROM to start it up. The screen boasted "Flab Beater – the wimp workout".

That was it, there was no other software. As I stared at the screen, appalled, A. crept up behind me and said "You don't get your Beeb back until you're in shape".

What could I do? I know when I'm beaten – most of the time in fact. I pressed the 1 key for the item on the menu labelled "Start here, softie". All I got was a message saying "You'll have to press harder than that", and that is what I've been doing all week.

I had to enter all the details about myself (supervised over by A. in one of her "there is no alternative" moods) and watch while the micro mocked me. "Well, Bunter", it began and then detailed a course of action that would make Daley Thomson weep.

And I had to do them. I couldn't fake it even though I tried. Instead of my five mile run I slipped off to the Gay Hacker, our local full-duplex pub, the only place where I wouldn't look out of place in the gear I was wearing (the Seb Coe/Stanley Livingstone look).

On my return however A. had attached some nasty looking wires to the micro which promptly took my heart rate and told me I hadn't done my jog. Curse Cook and his bits of kit. Worse was that it also acted as a lie detector and gave me an electric shock when I fibbed. Just mention a Master to me now and I start salivating.

The only good thing about the whole program was that if you were obedient it let you play a game where you had to avoid having sand kicked in your face. I was good at it, almost as if I'd been doing it all my life (which A. says I have been).

However enough is enough and eventually I cracked. This was when I found out that A. had mixed up pounds and kilos and I'd been killing myself for no reason.

By now I was fit enough to pick up the Master on my own and take it back to the shop whose manager is probably wearing a badge that says "Master dealers walk painfully".

However there have been some benefits. My wrists have stopped aching after long sessions, the keyboard is nearer and my effective can hurling range has improved much to Buster's disgust (though I think he's more annoyed that they're empties than anything else).

Do you realise that Charles Atlas really stands for catless? Now you know why.

Cheers,

Bob

PS: A. had to be carried home from the bellringers sober. Apparently she'd hurt her back on a big pull. I pealed with laughter.

Squashed characters

WITH regard to your otherwise excellent Squashed Character Set article, published in the May 1986 issue of The Micro User, *I would like to point out that Robin Nixon is incorrect when he states that the utility will not work in Modes 0, 1 or 3.*

*By manipulation of the video ULA, accessed through *FX154, it is possible to have an 80 column display in each of the above modes.*

To effect this, replace lines 190, 270, 280 and 300 as follows:

```
  190 MODE 1 : REM or MODE
0 or 3
  270 ?&30A=79
  280 ?&34F=8
  300 *FX154,153
```

Although this will make little difference in Modes 0 and 3 the advantages in Mode 1 will be considerable, giving an 80 column display and four colours. – **E.J. Golder, London SW18.**

Borrowed memory

I WISH to use the function keys to store some fairly lengthy strings, but find that the memory allocated to them is insufficient.

I understand from page 501 of the User Guide that just one page of memory is reserved for them at &B00.

If one does not want to have any user defined character definitions is there any way in which one can "borrow" page &C00? – **Mike Webber, Ilford.**

● The keys are accessed in memory by offsets – a distance measured from &B00. These offsets are stored in one byte and so cannot be greater than 255, meaning the definitions must be in page eleven (&B).

Any way round this problem would probably be longer than using a slightly different approach in your program. For instance define the key before use and use just one, constantly redefining it.

Smudged Hexer

I AM finding Mike Bibby's series of articles on machine code very interesting and educational.

I have a few queries however. On line 50 of the Hexer program the print has smudged. Is it £%=4 or @%=4?

What is the purpose of lines 40, 50 and 60? – **P. Chyioke.**

● Here are the lines you're interested in:

```
40 VDU 23;8202;0;0;0;
50 @%=4
60 *FX 202,32
```

Line 40 simply turns off the cursor while line 50 sets the field width for numbers to four characters in width, giving a tidy layout when examining memory.

Line 60 ensures that Caps Lock is chosen.

Triple splash

FOLLOWING the request in the May 1986 issue of *The Micro User* for a "splash" sound, we have taken the best three readers' efforts and put them in this short program. Thanks to the authors, who are acknowledged in REM statements.

```
   10 REM MARK LANE
   20 SOUND 8,-15,132,6
   30 SOUND8,-12,132,3
   40 A=GET
   50
   60 REM K.A.WHEAL
   70 ENVELOPE1,129,0,-10,-
1,1,0,2,6,-1,0,-1,126,74
   80 SOUND0,1,7,14
   90 A=GET
  100
  110 REM MICHAEL SMITH
  120 ENVELOPE 1,2,2,21,15,
0,0,1,-1,-2,-11,-1,126,112
  130 SOUND0,1,101,4
  140 A=GET
  150 RUN
```

Save one for luck . . .

MY friend and I have been following with interest your machine code series.

Storing and running on an assembly language/machine code program seems a fairly hit and miss affair. Sometimes, after running the code and receiving messages like:

0000

0000 A9 41

typing CALL&00 would get the desired effect, sometimes garbled messages like OSCLIOSCLIN, and sometimes nothing.

*We have also successfully, or so it seems, *SAVED what I assume is the machine code (assembled?) version, which can be executed by *RUNning it, but do not know the theories behind this.*

Apart from this, the course has been consistently well written and explained, and the ideas behind 6502 assembly language have already become much clearer to both me and my friend. – **Stewart Yorke, 14, Fareham** *writing for himself and Glenn Broadway.*

● You've probably come up against one of the features of *SAVE – you always have to save one more byte than you intended.

Take the following program for instance:

```
10 P%=&900
20 [
30 NOP
40 NOP
50 NOP
60 RTS
70 ]
```

The code generated runs from &900 to &903. However, if you use:

```
*SAVE "FILE" 900 903
```

you'll find that the last byte at &903 is not saved. As this last byte is often the final RTS, this can be vital, for it will be missing if you then *LOAD or *RUN the file.

The rule is to always *SAVE one more byte than you think you have to.

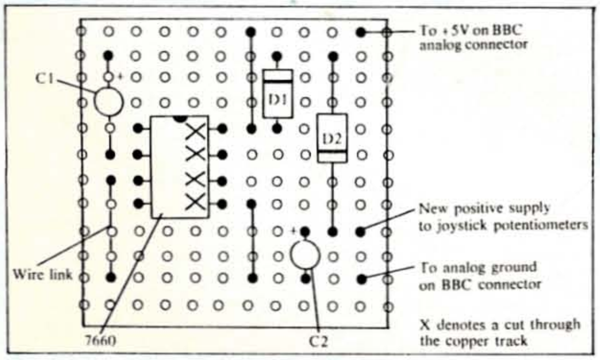
ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

Joystick circuit

A FEW minor errors crept in to Figure IV in the Joystick article published in the June issue of The Micro User. *This is the correct version – the main differences being that the diodes' polarities are marked, and some soldered joints changed.*



To +5V on BBC analog connector
C1
D1
D2
New positive supply to joystick potentiometers
To analog ground on BBC connector
Wire link
7660
C2
X denotes a cut through the copper track

p&h electronics Ltd

5 THE PARADE · YATELEY
HANTS
TEL: 0252 877222

☎ 24 HR SALES LINE
0252 878107

22/24 GUILDFORD ROAD
BAGSHOT · SURREY
TEL: BAGSHOT 0276 72928

BBC MICRO CENTRES

TELEPHONE OR VISIT

ALL PRICES INCLUDE VAT
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

FAST PHONE/MAIL SERVICE – 48 HOUR DESPATCH ON ITEMS IN STOCK
SUPPLIERS TO SCIENTIFIC AND EDUCATION AUTHORITIES

ACORN

Master 128K	£490.00
Master Turbo Upgrade	£125.00
Master 512 Upgrade	£399.00
Eprom Cartridge	£14.95
64K Upgrade Kit	£39.95
Z80 2nd Processor + Business Software	£399.00
6502 2nd Processor	£199.00
Bit Stick (CAD High Res Joystick)	£375.00
Teletext Receiver	£149.00
Prestel Receiver	£139.00
Music Synthesiser 500	£99.00
Acorn DNFS Kit	£95.00
Electron Plus 1	£59.00
1770 Upgrade	£46.00
ADFS ROM	£28.00

MONITORS

MONO	
Philips BM7502 Green High Res	£77.00
Philips BM7522 Amber High Res	£82.00
COLOUR	
Microvitec 1431 Standard Res	£215.00
Microvitec 1451 Medium Res	£285.00
Microvitec 1441 High Res	£485.00
Philips 8501 RGB Std Res + Sound	£199.00
Philips 8533 RGB Med Res + Comp Vid + Sound. Also switches to Mono	£270.00
TELEVISION/MONITORS	
Hitachi 1444 14in CTV + RGB	£199.00
Ferguson MC05 14in CTV + RGB (new)	£215.00
Philips 1114 14in CTV + RGB (new Super!)	£195.00
BBC – Monitor leads to suit	**£4.50**

PRINTERS

DOT MATRIX	
Tally MT80 + 100cps	£189.00
Tally MT85 with NLQ	£350.00
Epson LX80 with NLQ	£229.00
Epson LX80 Tractor Unit	£22.00
Epson LX80 Sheet Feeder	£55.00
Epson FX85	£365.00
Kaga Taxan 810 with NLQ	£260.00
Kaga Taxan 910 with NLQ	£439.00
Cannon PW1080A with NLQ	£270.00
DAISYWHEEL	
Juki 2200 with Keyboard	£299.00
Juki 6100	£399.00
Juki 6000	£225.00
Brother HR15	£395.00
BBC – Printer leads to suit	**£12.00**

DISK DRIVES

CUMANA	
CSX100 100k S/S 40T	£105.00
CS100 100K S/S 40T with P.S.	£140.00
CSX400 400k D/S 40/80T	£150.00
CS400 400k D/S 40/80T with P.S.	£175.00
CD800S Dual 400k with P.S.	£325.00
Opus 5802 – 400k D/S 40/80	£140.00
Opus 5802D Dual 400k with PS	£315.00
Opus Challenger	£249.00
Opus DDOS Interface Kit	£69.00
Pace PSD3 400k D/S 40/80T	£145.00
Pace PDD3P Dual 400K with PS	£299.00

ACCESSORIES

Data Recorder	£29.00
Data Recorder – BBC Lead	£4.00
Full Proportional Joy Stick	£12.50
Full Proportional Joy Stick Pair	£20.00
Voltmace 14b Joystick	£14.50
AMX Mouse – with Super Art	£75.00
AMX Utilities Software	£13.50
AMX Desk	£22.00
AMX Paintbox	£13.50
AMX 3D Zicon	£22.00
AMX Page Maker	£47.00
AMX Data Base	£22.00
AMX Xam	£22.00
AMX Super Art	£47.00
Modem Nightingale with Commstar	£149.00
Modem Auto Answer Board + Software	£75.00
Sideways ROM Board (ATPL)	£43.00
Computer Desk Double Width	£69.00
Disc Storage Box (50)	£19.00
Disc Storage Box (80)	£23.00
5¼in Discs 10 in Library Case DS/DD	£18.00
TV Aerial/Computer Switch	£2.50
BBC Key Function Key Mask	£2.50
Giant Reference Card for BBC	£3.00
Computer Covers Soft	£5.00
Computer Covers Hard	£10.00
Printer Covers – State Type	£5.50
Disc Drive Covers – State Type	£5.00
Analogue Mouse (by NIDD)	£33.00
Digital Mouse (by NIDD)	£33.00

ACORNSOFT-VIEW

View – Wordprocessor ROM	£49.00
View 3 inc. Printer Drivers	£79.00
Hi-View – For 2nd 6502 Processor	£50.00
Viewsheet – Spreadsheet ROM	£50.00
View Index Disc	£15.00
View Store – Database ROM	£49.00
Viewspell to be released	£35.00
Viewplot to be released	£35.00
Printer Driver Generator – Cassette	£10.00
Printer Driver Generator – Disc	£11.50

ACORNSOFT BOOKS

Creative Graphics	£7.50
Graphs and Charts	£7.50
Lisp Manual	£7.50
Forth manual	£7.50
S. Pascal Manual	£7.50
Comal Manual	£11.50
BCPL Manual	£15.00
ISO Pascal Manual	£15.00
Micro-Prolog Manual	£10.00
View Guide	£10.00
Viewsheet Guide	£10.00
Viewstore Manual	£10.00
Master Reference Manual Part 1	£14.95
Master Reference Manual Part 2	£14.95
Master Advanced Reference Manual	£19.95
Logo Manual	£7.50
Microtext Manual	£10.00

ACORNSOFT

Forth ROM	£47.00
Lisp ROM	£47.00
S-Pascal Disc	£19.50
ISO - Pascal ROM	£62.00
BCPL ROM	£95.00
Comal ROM	£47.00
Logo ROM	£65.00
Turtle Graphics Cassette	£16.50
Graphics Extension ROM	£28.00
Graphics Extension ROM for B Plus	£28.00
Microtext Cassette	£47.00
Microtext Disc	£55.00
Creative Graphics Cassette	£9.50
Graphs and Charts Cassette	£9.50
French for Electron Also	£14.50
Italian for Electron Also	£14.50
Spanish for Electron also	£14.50
German for Electron also	£14.50
Basic Editor	£28.00
Database Disc	£16.50
Micro Prolog (new)	£76.00
ISO Pascal Stand Alone Generator	£34.00

TOP GAMES

Doctor Who Cass + ROM	£17.00
Doctor Who Disc + ROM	£18.00
Elite	Cas. £13.50 Disc £16.50
Revs	Cas. £13.50 Disc £16.50
Revs II	(4 Track) Disc £11.50
Aviator	Cas £13.50 Disc £16.50
Castle Quest	Cas. £11.00 Disc £13.00
Scrabble	Cas. £12.50 Disc £17.00
Whiteknight 12 Chess	Cas. £9.50 Disc £18.50
Snooker	Cas. £9.50 Disc £11.00
Repton	Cas. £9.50 Disc £11.50
Repton II	Cas. £8.50 Disc £10.50
Monopoly	Cas. £12.50 Disc £17.00
Red Arrows	Cas. £8.00 Disc £10.50
Jump Jet	Cas. £9.00 Disc £10.50
Lord of the Rings Part I	£14.50
Citadel	Cas. £8.50 Disc £10.50
Exploding Fist	Cas. £8.50 Disc £13.50
Phantom Combat	Cas. £9.50 Disc £14.50
Strike Force Harrier	Cas. £9.50 Disc £14.50
Nightshade	Cas. £9.50
Karate Combat	Cas. £8.50 Disc £10.50
Yie Ar Kung Fu	Cas. £8.50 Disc £10.50
Hypersports	Disc £11.50
Decathlon	Disc £8.50
Who Dares Wins II	Disc £8.50
Commando	Cas. £9.50 Disc £12.50
Phantom Combat	(for 2B's) Disc £19.00

ROMS/UTILITIES

Wordwise Plus	Rom	£46.00
Intersheet	Rom	£50.00
Interword		£49.00
Interbase to be released		POA
Interchart	Rom	£34.00
Disc Doctor	Rom	£26.00
Printmaster	Rom	£26.00
Graphics	Rom	£26.00
Speech	Rom	£26.00
Termi II	Rom	£32.00
Communicator	Rom	£65.00
Toolkit Plus	Rom	£36.00
Exmon II	Rom	£30.00
Murom (Music)	Rom	£28.00
Master File II	Disc	£18.00
Help II	Rom	£29.00
Sleuth	Rom	£28.00
Spellcheck III (View + W/W)	Rom	£33.00
Hershey Characters	Disc	£19.00
Hershey Characters	Cassette	£11.00
Logo (LCSI)	Rom	£59.00
Replica III 40/80	Disc	£14.00
Beta Base 40/80	Disc	£23.00
Vine Replay (State Disc I/F)	Rom	£33.00
Vine Tape to Disc	Rom	£18.00
Island Logic Music	Cassette 1	£13.50
Island Logic Music	Cassette 2	£13.50
Island Logic Music	Disc	£27.00
Wordease	2 Roms	£27.00
Program Builder	Cas. £14.50 Disc	£19.00
Studio Eight	Cass £15.50 Disc	£20.00
Icon Master	Rom	£31.00
Romit	Rom	£32.00
Dumpmaster II	Rom	£29.00
Fleet Street Editor	Disc	£38.00
Spelling Checker (Comp Con)	Rom	POA

COMPUTER BOOKS

BBC User Guide Binder	£3.95
Advanced User Guide	£12.95
Advanced User Guide Binder	£3.95
Advanced Basic ROM BBC	£7.95
Advanced Graphics with the BBC	£9.95
Applied Assembly Language BBC	£7.95
30 Hour Basic	£6.95
Basic ROM User Guide	£9.95
BBC Micro Disc Companion	£7.95
Disc Programming Technics for BBC	£7.95
The BBC Micro ROM Book	£9.95
6502 Applications	£13.95
6502 Assembly Language Programming	£19.95
6502 Assembly Language Subroutines	£19.95
Word Processing Book	£4.95
Word Star and CPM Made Easy	£6.95
Word Star Fast Reference Guide	£4.35
Word Star Made Easy	£16.95
Introduction CPM Z80 2nd Proc (new)	£9.95
Wordwise Plus (new)	£9.95
Making Most of your BBC Disc System	£5.95
Creating Adventures on BBC	£5.95
Step by Step Programming BBC Book I	£5.95
Micronet Handbook	£6.95
40 Best Machine Code Routines BBC	7.95
Assembly Language Programming on BBC	£11.50
BBC Micro Advanced Reference Guide	£10.95
Advanced Disc User Guide	£14.95
Advanced Machine Code Tech for BBC	£7.95
Art of Micro Graphics BBC/Electron	£14.95
BBC Micro and the Small Business	£5.75
BBC Micro Advanced Programming	£9.95
Beginners Guide Word Processing on BBC	£6.95
Beyond Basic	£7.25
Building Blocks for BBC Games	£6.95
Guide to BBC Roms	£9.95
Mastering Assembly Code on BBC (BBC Pub)	£8.95
Mastering Music on BBC (BBC Pub)	£6.95
Mastering the Disc on BBC (BBC Pub)	£7.95
Mathematical Prog in BBC Basic	£7.95
Structured Basic	£7.25
The Super Users BBC Micro Book	£10.95
6502 Reference Guide	£9.95
Programming the 6502	£16.95

MAIL ORDER COUPON

P&H ELECTRONICS LIMITED
22/24 GUILDFORD ROAD · BAGSHOT · SURREY GU19 5JN

Please send me: (or order by letter)

1 at £ P&P
2 at £ P&P
3 at £ P&P

I enclose cheque/PO for £

Or please debit my Access/Barclaycard/Visa* *(delete as applicable)*

Card Number Expiry Date Telephone

FAST VAT FREE EXPORT SERVICE ON ORDERS OVER £15 NETT
PLEASE ALLOW FOR CARRIAGE COSTS OR REQUEST CARRIAGE QUOTATION

CARRIAGE COSTS – Micros – Monitors – Disc Drives – Printers – Desks – 2nd Processors: £7
Cassette Decks: £3. – Books: £1 per book – Software – Leads £1. per item.
ACCESS/BARCLAYCARD/VISA ORDERS WELCOME
CREDIT FACILITIES Instant credit up to £1,000, deposit 10%

PLEASE STATE; DISK FORMAT 40 OR 80 TRACK

Name
Address

MU7

SPECIAL OFFER

SAVE OVER £35

Micronet 800

Micronet 800 is the UK's most popular database for BBC users. There's FREE SOFTWARE, FREE ELECTRONIC MAIL, 70,000 other users nationwide, your own technical and user group areas, plus Prestel* and much, much more!

As a special offer to BBC owners, Micronet is offering you your first quarter's subscription to Micronet & Prestel plus the Micronet Modem 2000† (ROM software)

All for £49.95

ACT NOW. Offer only open whilst stocks last. Simply complete the coupon below and return it to the address shown.

Send to: **Micronet 800, Telemap Ltd, 8 Herbal Hill, London EC1R 5EJ.**

Please rush me my Prism 2000 modem and three-month subscription to Micronet 800 and Prestel.
I enclose a cheque/postal order to £49.95

Or please debit my Access/Visa card No:

NAME: ....

ADDRESS: ....

....

.... POST CODE..........

Make cheques payable to Telemap Ltd. Allow 28 days for delivery. MU7 86

Make the most of your micro

†APPROVED for use with telecommunication systems run by British Telecommunications in accordance with all conditions and instructions for use.
(S/1127/3/D/021674)

*Prestel and the Prestel symbol are Trade marks of British Telecommunications

POOLSWINNER

THE ULTIMATE POOLS PREDICTION PROGRAM

Boxed, with detailed instruction booklet

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years. The database updates automatically as results come in.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **DISC/MICRODRIVE COMPATIBLE** Tapes supplied with conversion instructions.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

AVAILABLE FOR Spectrum (48K), Commodore 64, VIC 20 (+16K), AMSTRAD, BBC B, Atari (48K), ZX81 (16K), Dragon, Apple II, ELECTRON

PRICE £15.00 (all inclusive)

CPC & PCW VERSIONS AVAILABLE add £3 for 3" disc

FIXGEN 85/6

AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish fixtures for 1985/6. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner.

POOLSWINNER with FIXGEN £16.50 (all inclusive)

COURSEWINNER V3

THE PUNTERS COMPUTER PROGRAM

NOT JUST A TIPSTER PROGRAM, Coursewinner V3 can be used by experts and occasional punters alike.

You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date.

AVAILABLE FOR Spectrum (48K), Commodore 64, BBC (B), AMSTRAD, Atari (48K), Apple II

PRICE £15.00 (all inclusive) includes Flat AND National Hunt versions.

Send Cheques/POs for return of post service to . . .

VISA phone 24 hrs

selec SOFTWARE

phone 24 hrs

37 COUNCILLOR LANE, CHEADLE, CHESHIRE. ☎ 061-428 7425

(Send for full list of our software)

IN BROMLEY

BROMLEYS FIRST SPECIALIST COMPUTER STORE

We are official Acorn Dealers with high standards to maintain and take pride in friendly and efficient advice and service.

See our extensive range of printers, monitors, disc drives, software and books.

Data Store

6 Chatterton Road, Bromley, Kent. 460 8991

B AND S COMPUTING

55 CEDAR AVENUE, LONG EATON,
NOTTINGHAM NG10 3JQ.

BUSINESS SYSTEMS · HARDWARE · SOFTWARE
VIDEO SYSTEMS · MEDIA SUPPLIES

Callers welcome to our distribution centre.
Please phone for appointment.

Tel: 0602 736273

ACORN PRODUCTS

BBC Master 128	£404 (a)
BBC Master ET (Econet filing system only)	£328(a)
Turbo Upgrade	£95(c)
Turbo 512 Upgrade	P.O.A.
SC Upgrade	P.O.A.
Master Eprom Cartridge	£13(e)
BBC B + 64K	£369(a)
BBC B + 128K	£389(a)
64K Upgrade kit for B + 64K	£29(d)
Z80 Second Processor	£324(a)
6502 Second Processor	£164(a)
1770 Disc Interface	£39(e)
ADFS ROM (BBC B + or BBC B with 1770 Interface)	£25(e)
Games Paddles	£16(d)

DOT MATRIX PRINTERS

Star SG10 80 col/120 cps + 30 cps NLQ	£199(a)
Star SG15 136 col/120 cps + 30 cps NLQ	£284(a)
Kaga KP810 80 col/150 cps + 27 cps NLQ	£189(a)
Kaga KP910 156 col/150 cps + 27 cps NLQ	£364(a)
Mannesmann Tally MT80 + 80 col/100 cps	£161(a)
Mannesmann Tally MT85 80 col/180 cps + 45 cps NLQ	£299(a)
Mannesmann Tally MT86 136 col/180 cps + 45 cps NLQ	£399(a)
Epson LX80 80 col/100 cps + 22 cps NLQ	£199(a)
Epson FX85 80 col/160 cps + 32 cps NLQ	£329(a)
Epson FX105 136 col/160 cps + 32 cps NLQ	£474(a)

* CITIZEN SPECIAL OFFERS *

Citizen 120D 80 col/120 cps + 25 cps NLQ	£150(a)
Citizen MSP10 80 col/160 cps + 40 cps NLQ	£261(a)
Citizen MSP15 136 col/160 cps + 40 cps NLQ	£329(a)
Citizen MSP20 80 col/200 cps + 50 cps NLQ	£314(a)
Citizen MSP25 136 col/200 cps + 50 cps NLQ	£391(a)

** ALL CITIZEN PRINTERS HAVE A TWO YEAR WARRANTY **

DAISY WHEEL PRINTERS

Juki 6000 80 col/12 cps	£182(a)
Juki 6100 136 col/20 cps	£319(a)
Epson DX100	£329(a)

PLOTTERS

Epson Hi80 A4	£329(a)

MONITORS

Philips BM7502 High Res Mono Green + Sound	£69(a)
Philips BM7522 High Res Mono Amber + Sound	£73(a)
Philips BM8501 Std Res Colour RGB + Sound	£171(a)
Philips BM8533 Med Res Colour RGB + Composite Video + Sound (Green screen switchable)	£222(a)
Philips CF1114 TV/RGB Monitor	£169(a)
Microvitec 1431MS Std Res Colour RGB	£179(a)
Microvitec 1451MS Med Res Colour RGB	£224(a)
Microvitec 1441MS High Colour Res RGB	£375(a)

* ALL MONITORS ARE SUPPLIED WITH A FREE BBC LEAD *

DISC DRIVES

Opus single SS 40T 100K	£73(a)
Opus Single DS 40/80T 400K	£112(a)
Opus Single DS 40/80T 400K + PSU (Dual Case)	£132(a)
Opus Dual DS 40/80T 800K + PSU	£249(a)

* INTRODUCTORY OFFER *

Opus Challenger 3: 40/80T DS Drive, 256K RAM Disc, Opus Double Density DOS, Manuals and Leads	£184(a)

MODEMS

Miracle WS2000 + BBC Lead	£109(c)
WS2000 Auto Dial and Auto Answer Boards	P.O.A.
Miracle Databeeb Communications ROM	£24(e)
Miracle WS3000 V2123 + BBC Lead	£269(a)
Miracle WS3000 V22 + BBC Lead	£449(a)
Miracle WS3000 V22bis + BBC Lead	£599(a)
Pace Nightingale + Commstar + BBC Lead	£114(c)
Nightingale Auto Dial/Auto Answer Board	£44(d)
Nightingale Auto Dial/Auto Answer Software	£10(e)
Pace OBBS Bulletin Board Software	£19(e)

*** PLEASE NOTE: BABT APPROVAL ON MODEMS ONLY ***

FANFOLD PAPER AND LABELS

2000 × 1 Part 60gm 11" × 9.5" Std Perf	£10(c)
1000 × 1 Part 85gm 11" × 9.5" Micro Perf	£9(c)
2000 × 1 Part 60gm 11" × 15" Std Perf	£15(b)
1000 × 2 Part NCR 60gm 11" × 9.5" Std Perf	£17(b)
1000 Labels 90mm × 36mm (Single or twin row)	£4(d)
1000 Labels 90mm × 49mm	£6(d)
1000 Labels 102mm × 36mm	£5(d)

PRINTER ACCESSORIES

Epson 8143 Serial XON/XOFF + 0K Buffer	£26(d)
Epson 8148 Serial XON/XOFF + 2K Buffer	£55(d)
Epson 8172 Parallel 32K Buffer	£99(d)
Mannesmann Tally MT80 + RS232C + 0K Buffer	£39(d)
Epson MX80/RX80/FX80/FX85/Juki 5510 Ribbon	£4.50(e)
Epson 8762 LX80 Ribbon	£4(e)
Epson 8302 LX80 Tractor Unit	£19(c)
Epson 8338 LX80 Single Sheet Feeder	£49(b)
Mannesmann Tally MT85/M86 Font Cartridge	£17(e)

* COMPREHENSIVE RANGE OF ACCESSORIES SUPPLIED *

LANGUAGES

Micro-Prolog	£48(d)	ISO-Pascal	£41(d)

BCPL £37(c). Forth £29(e). Comal £29(e). LISP £29(e)

BUSINESS SOFTWARE

View 2.1	£36(d)	View Sheet	£36(d)
View 3.0	£57(d)	View Store	£35(d)
Hi-View	£37(d)	View Index	£10(e)
View Printer Driver Generator	Tape £7(e) Disc £8(e)		
Inter-Sheet	£39(d)	Inter-Chart	£26(d)
Wordwise	£29(d)	Wordwise Plus	£44(d)

BOOKS (No VAT on Books)

Master Reference Manual:	Part 1 £14(d). Part 2 £14(d)		
Advanced Master Reference Manual	£19(d)		
ISO Pascal	£9(e)	BCPL User Manual	£14(d)
Forth	£7(e)	Introduction to Comal	£9(e)

Into View £2.24(e). View Sheet £9(e). Lisp £7(e)

* LARGE RANGE SUPPLIED – PHONE FOR DETAILS *

TOP GAMES (T)=TAPE (D)=DISC CARRIAGE: (e)

Yie Ar Kung Fu	(T) £7.49 (D) £9.49
Strike Force Harrier	(T) £7.99 (D) £10.49
Hyper Sports	(T) £7.49 (D) £9.49
Elite	(T) £11.99 (D) £13.99
Citadel	(T) £7.99 (D) £9.49
Repton 2	(T) £7.99 (D) £9.99
Monopoly	(T) £10.49 (D) £11.99
Matchday	(T) £7.49. Night Shade (T) £7.99

* OTHER TITLES AVAILABLE – PLEASE PHONE *

UK customers: please add 15% VAT to all prices (including carriage) Government and Educational establishments official orders welcomed. When ordering please enclose a cheque or postal order for the appropriate amount.

Carriage rates: (a) £8.50 - overnight insured delivery. (b) £3.50. (c) £2.50. (d) £1.50. (e) £1.00. All prices are correct at time of going to press. All offers are subject to availability. All prices are subject to change without prior notification and are available on request. Current price list is available on request.

FLOPPY-WISE PLUS

FOR THE BBC MICRO
THE SUPER-ROM TO ECLIPSE ALL OTHERS
40 COMMANDS ON A 16K CHIP

COMMAND LIST: Ascii, Autosave, Bad, Bmove, Clear, Clm, Clone, Convert, Crom, Derrors, Download, Dsearch, Dspace, Dtape, Dts, Dzap, Edit, Fcompare, Find, Format, Free, Idzap, Mcopy, Menu, Move, Msearch, Mzap, Prepare, Protect, Ramload, Rcopy, Recover, Restore, Roms, Rsearch, Rzap, Tdisk, Tds, Tokens, Verify.

£29.95 + £1 p&p

*** FULLY TUBE COMPATIBLE ***

Must not be used to infringe copyright laws.

"Thoroughly Recommended" Micro User Nov. '85

NEW **LOC-KIT** Professional Disk Protection System

Full Protection of disks and programs. Stop use and/or copying. **40/80T DISK.**

£25.00 + 50p P&P

NEW **PROC-KIT** **THE** Procedures Management System

Up to **255 Files** on any disk with automatic saving and loading of files from disk or program (embedded procedures and GOTO's all catered for). List, Rename or Merge any file.
PLUS: 40 Procedures to start you off – including a special **OVERLAY** Routine for program extension allowing effective lengths up to 400K
40/80T DISK with single disk drive.

£10.95 + 50p P&P

SOFTWARE SERVICES
65 South Mossley Hill Road,
Allerton, Liverpool L19 9BG.
Tel: 051-427 7894

SHARDS SOFTWARE

presents two bumper compilations available
NOW on your BBC

THE ADVENTURER

A compilation of four of the most original and acclaimed adventures yet released for the BBC Micro. With full instructions, hint sheets and save options. Suitable for a wide range of age-groups and recommended as good family entertainment. These adventures are packed full of mysteries, puzzles, challenges and intrigue and are presented in graphics and text.
Explore the sinister village of **Woodbury End** and discover its strange secrets. Travel through three continents guided by the mysterious **Pettigrews Diary.** Mount your expedition to the south seas to encounter the **Mystery of the Java Star.** Travel back in time to the holy land and experience the unique atmosphere of **Galilee.**

FUN ACADEMY

This educational compendium is suitable for children between the ages of 6-16, most routines offering variable difficulty levels to suit the ability of the player. The content of these games has been approved and endorsed by educational authorities, parents and software reviewers alike, offering the child the best that the computer can offer in the way of playability, sound, colour and graphics, with solid educational content in the best traditions.
The 22 routines offered cover area estimation, times tables, simple arithmetic, logical thinking, mental arithmetic, proportions, estimations, fractions, alphabet, spelling, letter grouping, word puzzles, code breakers and anagrams.

These compilations are available for
ONLY £14.95 (disc) or £12.95 (tape)
(Each adventure is available separately for **£3.95** (tape), **£5.95** (disc)

Either phone your ACCESS/VISA order to **01-514 4871** or send the coupon to ***Shards Software, Freepost (No stamp required) Ilford, Essex IG1 2BR.***

Please send me ______________________
Name ______________________
Address ______________________

I enclose a cheque/PO/VISA/ACCESS for __________
Credit card number __________
Please send me a copy of your catalogue ☐

DISCS

AT LOW PRICES IN PLASTIC LIBRARY CASES

5¼"	10	3½"	10
DSSD	**£7.99**	SS 135tpi	**£15.95**
DSDD (96tpi)	**£9.99**	DS 135tpi	**£19.95**

BULK DISCS AT CRAZY PRICES

5¼"	25	100
DS 96tpi	**£14.99**	**£49.99**
3½"	25	100
DS 135tpi	**£39.99**	**£149.99**

Epson LX80 (NLQ)	**£219.95**
Epson JX80 (Colour)	**£399.00**

MEMORY CARDS FOR THE NIMBUS

½ Megabyte Upgrade for the Nimbus	**£119.99**
1 Megabyte Upgrade for the Nimbus	**£199.99**

All prices include VAT and P&P.

Please call for bulk and education prices

Centec Electronic Systems Ltd
47 SPUR ROAD, ORPINGTON, KENT BR6 0QT
Tel: 0689 35353

Software Supersavers

BBC

1.99

MPOWER	RUBBLE TROUBLE
MPOWER	MOONRAIDER
MPOWER	WIZARDS CHALLENGE
MPOWER	FELIX AND THE FRUIT MONST
VIRGIN	SPACE ADVENTURE
MPOWER	FELIX & THE EVIL WEEVILS
QUICK	PROTECTOR
QUICK	WIZARD
DIGIT	TIME MACHINE
DIGIT	WIZARD OF AKRYZ
ACORN	CRANKY
ASP	PROGLET
CDS	CASTLE BLACKSTAR
LOTH	BATTLEZONE 2000
LOTH	STOLEN LAMP
ASP	BISMARCK
MPOWER	CYBERTRON MISSION
VIRGIN	PLACK WALK
LOTH	ROMAN EMPIRE
MICRO	FRENZY
MICRO	CHESS
GDHOUS	MR T: MONEY BOX
GDHOUS	MR T: MEASURING GAMES
GDHOUS	MR T: MEETS HIS MATCH
ICON	CHRYSALIS
VISION	DEMOLATOR
VISION	DIGGER
VISION	GALAXY RAIDERS
VISION	ULTRON
VISION	DAREDEVIL DENNIS
VISION	WARLORDS OF DOOM
VISION	PENGI
MPOWER	SWOOP
IMAGIN	B.C.BILL
IMAGIN	COSMIC CRUISER
ULTIM	JET BACK
POST	SHADOWFAX
MICTRS	CROSSWORD PUZZLER
GRIFF	MATHSKILL II
GRIFF	MENTAL ARITHMETIC
GRIFF	GET SET
GRIFF	ENGLISH SKILLS II
GRIFF	DOLL AND DRUM
GRIFF	ODD ONE OUT
GRIFF	ATOMS AND MOLES
ENGSOF	JET BOOT JACK

2.95

LONGMN	FIRST MOVES (CHESS)
INCEPT	ARABIAN NIGHTS

3.50

GRIFF	FAIR SHARE
ACORN	MISSING SIGNS

MRM	ARTIST
A'N'F	CHUCKIE EGG
VISION	SNOOKER
ADVENT	GREMLINS
USGOLD	BEACH HEAD

4.95

LSRGNS	KENSINGTON
ATARI	ROBOTRON
ULTIM	ALIEN 8

7.90

SALAM	GRAPHICS

BOOKS 2.50

BBC MICRO REVEALED
36 CHALLENGING GAMES FOR THE BBC MICRO
PUTTING YOUR BBC MICRO TO WORK
INSTANT ARCADE GAMES FOR THE BBC

5.99 +40p P+P

LOTHLORIEN
2000
LOTHLORIEN
EMPIRE
LOTHLORIEN
WAR PACK

LIMITED 1st COME–1st SERVED STOCK

more for.... ELECTRON

2.50

MRM	NIGHTMARE MAZE
GRIFF	TABLE SUM
GRIFF	NUMBER FUN
GRIFF	WORDGAMES

SEND FOR OUR FREE CATALOGUE

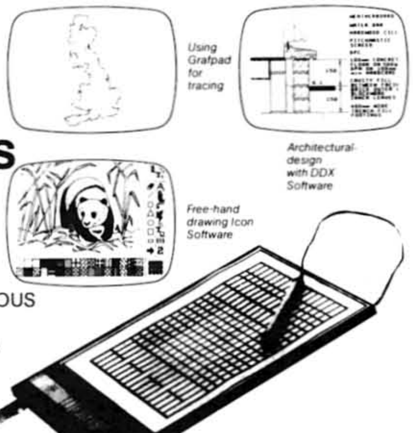
To: **AGF, Unit G, Ashgrove Industrial Park, Bognor Regis, West Sussex.**
Please send me ______________________
____
I enclose my cheque/PO for £ Please make cheques payable to **AGF** Direct Mail Discount. I wish to pay by:
Access ☐ Visa ☐
My credit card number is: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
ADD 20P PER TITLE FOR P&P
NAME ______________________
ADDRESS ______________________
______________ POSTCODE ______________
SIGNATURE ______________ DATE ______________
STATE WHICH MACHINE
☎ 24 hrs (0243) 823337

SEND FOR OUR FREE CATALOGUE

EMPIRE
2.50
+20p P+P

THE AMAZING GRAFPAD II

AVAILABLE FOR IMMEDIATE DESPATCH FROM Viglen


Using Grafpad for tracing
Architectural design with DDX Software
Free-hand drawing Icon Software

THE ULTIMATE IN GRAPHIC INPUT DEVICES

FOR THE BBC MICRO.

GRAFPAD II: ● A brilliant British invention manufactured in Gt. Britain, unequalled in the world of graphics input.

SPECIFICATION
Resolution:
1280 x 1024 pixels
Repeatability:
1 pixel
Output rate:
2000 co-ordinate pairs per sec.
Interface:
parallel
Origin:
LH corner or selectable
Dimensions:
350 x 260 x 12 mms.

IT COMBINES IN ONE DEVICE ALL THE FACILITIES OF PREVIOUS ATTEMPTS AT INPUT DEVICES. THE APPLICATIONS ARE AS NUMEROUS AS THAT OTHER COMMONLY HELD DEVICE—A PEN!—AND INCLUDE: ● Option Selection ● Form Input ● Data Collection ● Logic Design ● Circuit Design ● Picture creation ● Picture storage ● Picture retrieval ● Construction design ● C.A.D. ● Text Illustration ● Games ● Pattern Design ● Education ● PCB Design

● A4 SIZE DRAWING AREA ● HIGH RESOLUTION COLOUR ● HOME AND BUSINESS USE ● VARIETY OF OPTIONAL PROGRAMMES ● FREE HAND DRAWING ● CIRCUIT DIAGRAMS ● C.A.D. ● PCB LAYOUTS ● EASY TO USE

FREE ICON DRAWING SOFTWARE WITH EACH GRAFPAD II ON DISC

£59.50 inc. VAT

EDUCATION & DEALER ENQUIRIES WELCOMED

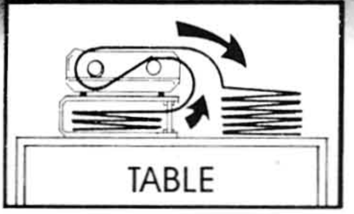
Post to: Viglen Computer Supplies, Unit 7, Trumpers Way, Hanwell W7 2QA. Phone: 01-843 9903.
Please Send me (specify items) ________ I enclose Cheque/P.O. for £ ________ Add £2 p&p or £8 for courier insured delivery.
Cheques payable to Viglen Computer Supplies or debit my ACCESS/BARCLAYCARD No. ________
NAME: ________ ADDRESS ________

You can pay by credit card or telephone your order.
Signature ________ MU7

NEW! from Viglen COMPUTER SUPPLIES

A PRINTER STAND

VIGLEN WILL BE CLOSED FOR THE SUMMER HOLIDAYS FROM AUGUST 1st TILL AUGUST 17th



- For 80 column matrix printers
- Raises printer high enough to put continuous stationery underneath
- Beautifully finished in clear perspex ● Viglen quality every time
- Will accept paper up to 12½" wide ● Non slip rubber pads

Dimensions: 15" (380mm) wide (320mm) deep 4" (90mm) high
Also available 136 column stand @ £27 inc. VAT.

Printer Stand
£16.95 INC. VAT
Carriage & Packing £3.00

COME TO VIGLEN FOR A FAST, FRIENDLY, PERSONAL SERVICE

DEALER ENQUIRIES WELCOME

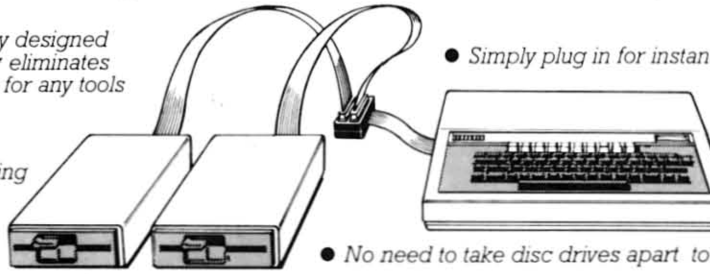
Prices subject to change without notice

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA.
MU7
Please send me ________ (qty) PRINTER STANDS at £19.95 each. enclose Cheque/P.O. for £ ________ made out to
VIGLEN COMPUTER SUPPLIES or debit my ACCESS/BARCLAYCARD No. ________
Name ________ VISA Signature ________
Address ________

DUAL DRIVES FOR LESS THAN £17?

Convert your single disc drives into duals for only £16.95inc. VAT

- *Specially designed circuitry eliminates the need for any tools*
- *Simply plug in for instant dualling*
- *No Mess*
- *New improved longer cable reaching back of computer*
- *No soldering*



- *No need to take disc drives apart to change links*

The Viglen DUCK (Dualling Up Connector Kit) can convert single drives to duals, instantly!

Just plug the **Viglen Duck** into the BBC micro and any two single disc drives to create a dual disc drive. Drives will be configured Drive 0 and Drive 1 automatically.

● *Fast Back-Up* ● *Fast Copying of Files*

The Viglen Duck will dual-up any make or type of single disc drives with PSU (power supply unit). Will work on a mixture of drives, single and/or double sided combined. If you have disc drives without built-in PSU, then you will require a dual power connector for the BBC micro – available from Viglen for only £8.00 inc VAT.

- Postage and packing **£2.50** inc. VAT.
- *Official Orders from Government and Educational Establishment welcomed.*

Orders to: Viglen Computer Supplies
Unit 7, Trumpers Way, Hanwell W7

Credit Card holders may order by telephone: **01-843 9903**

All prices correct at time of going to press

VIGLEN WILL BE CLOSED FOR THE SUMMER HOLIDAYS FROM AUGUST 1st TILL AUGUST 17th

cartridges can also be used on the Master with the special Viglen adapter – out soon.

YOUR ROMS WOULD BE HAPPIER IN A VIGLEN ROM CARTRIDGE SYSTEM

Tel: 01-843 9903
ACCESS/BARCLAYCARD
Credit Card holders can purchase by telephone. Please give Card No., Name, Address, and items required.

The safest way to look after your growing collection of ROMs is to store them in Viglen's specially designed cartridge systems, this not only keeps them happy, but also removes the risk of damage to your BBC micro.

There are two systems – the 'Standard' and the 'Low Profile'. Viglen is the leading producer of both.

ADVANTAGES OF VIGLEN ROM CARTRIDGE SYSTEM

● All cartridges are gold-plated for durability and reliability, unlike others which are only silver plated. ● No need to switch machine off between cartridge changes. ● Insert and remove 'Wordwise' 'View' 'Disc Doctor', etc., at will, from your micro in absolute safety. ● Low, low power consumption unlike other systems. ● Save on memory.

PRICE FOR COMPLETE KIT, including 1 cartridge, 1 Cable Assembly, 1 Blanking Off Plate (used if system is removed), 1 Socket Cover (used when no cartridges are resident), 1 Cartridge Storage Rack. **£15.95**

Extra Cartridges: £2.95 each, four for £11.00, ten for £26.50. Kit comes with 1 ROM Cartridge. All prices inc. VAT.

THE STANDARD SYSTEM

Over 50,000 sold

The Standard System used extensively in education is preferred, due to its robust construction and ease of use.

LOW PROFILE SYSTEM

With the sideways entry on the low profile system access to the escape and tab keys are slightly restricted. However Viglen betters its rivals in this respect by being 3mm lower.

Personal Callers
Mon-Fri. 9.30-5.30pm. Sat. 9.30-2pm.

Post to: VIGLEN Unit 7 Trumpers Way Hanwell W7 2QA

Please send me (state type and quantity) ____________ Kit(s) ____________ Cartridges

I enclose Cheque/P.O. for £____________ Please add £2.50 for postage and packing (50p only for single cartridge)

I prefer to pay by ACCESS/BARCLAYCARD * (Delete whichever is not applicable).

Card No. ____________ Signature ____________

Name ____________ Address ____________

____

MU7

Credit Cards valid if signed by Cardholder. Address must be the same as card holder's.

VIGLEN WILL BE CLOSED FOR THE SUMMER HOLIDAYS FROM AUGUST 1st TILL AUGUST 17th

the best partners for your computer

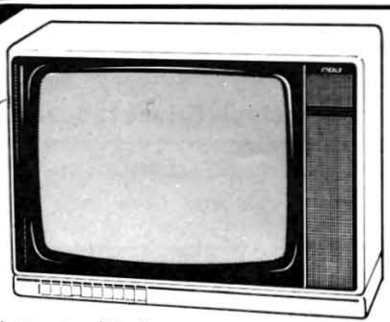
Please Phone For Latest Low Prices!

All the peripherals for your BBC Model B

the best service – the best value

Monitors

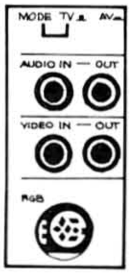
NEW



PHILIPS Colour TV/ Monitor Model 1114

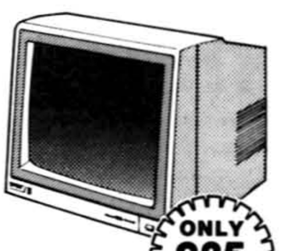
14" Tube (V34cm) Receiver/Monitor

● Light and compact finished in white with dark picture surround. ● In-line 14" picture tube provides a sparkling picture in seconds. ● Designed to give exceptional reliability and performance. ● 10 pre-select channel buttons. ● ● Headphone/tape recorder socket with separate loudspeaker mute switch. ● ● Loop aerial and main aerial connection. ● RF, CVBS and RGB inputs.



Price **£199** inc. VAT

PHILIPS Model BM7502 Green Screen Mono



From the highly successful 'Philips 80 Range', here is a monitor specially designed to display graphics and alphanumeric data with perfect clarity.
● 12" high resolution, 20MHz band width, anti-glare screen. ● Composite Video (CVBS) and Audio Input. ● 2000 character (80 x 25) display. ● Amber screen – £6 extra. ● Ideal low price for your BBC B.

ONLY £85 INC. VAT

PHILIPS NEW Colour Monitors Model CM8501

● Std resolution. ● Grey glass screen. ● RGB – linear/TTL – inputs (SCART/8 Pin DIN). ● Audio input. ● Bandwidth 8 MHz. ● Adjustable foot.

Please call for latest low price

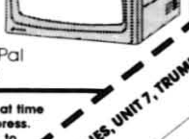
NEW

Model CM8533

● Med. resolution. ● Dark glass etched screen. ● ● Composite video input (phono). ● RGB – linear input (SCART). ● RGB/RGBI – TTL input (8 Pin DIN). ● Audio input. ● Green (Mono) switch. ● Bandwidth 12 MHz. ● Adjustable foot.

Price **£289** INC. VAT

Microvitec Monitors



Standard	£219
Med	£289
High	£429
Med & Pal	£329

Printers

Dot Matrix

Taxan Kaga KP810	£249
Canon PW1080A	£279

Daisy Wheel

Juki 6100	£299
Quen Data	£199
Epson DX100	£359

Please add £8 for 1½ metre length printer lead for the BBC micro.

BBC Master 128k £489 inc VAT

Visit our showroom:
Open
9.30 – 5.30
Mon to Sat
9.30-2pm.
Saturdays

Sales Hotline 01-843 9903

Please call for latest prices, product details and to place credit card orders. Government and Educational Establishments enquiries welcome

All prices inc VAT

PLEASE ENQUIRE ABOUT OUR EXTENSION KEYBOARDS, KEY PADS & EPROM PROGRAMMER

Discs

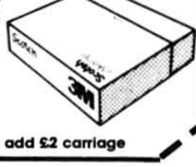
3M Scotch Discs

5¼" single-sided diskettes

Double density – Lifetime guarantee

10 DISCS PER BOX

	Per box
SS 40 TRACK	£13.00
DS 40 TRACK	£15.00
SS 80 TRACK	£19.50
DS 80 TRACK	£22.00



Prices include VAT

Please add £2 carriage

Prices correct at time of going to press. Offers subject to availability.

Post to: VIGLEN COMPUTER SUPPLIES, UNIT 7, TRUMPERS WAY, HANWELL W7 2QA. Telephone: 01-843 9903.

Please send me ____
Please add £8 carriage per item (except discs) ____ I enclose Cheque/P.O. for £____
I prefer to pay by ACCESS/BARCLAYCARD* (Delete whichever is not applicable).
Card No ____
Signature ____
Name ____
Address ____

MU7

A VERY SPECIAL OFFER from Viglen

VIGLEN WILL BE CLOSED
FOR THE SUMMER HOLIDAYS
FROM AUGUST 1st TILL
AUGUST 17th

Please Phone For Latest Low Prices!

The Superb Mitsubishi 400K LATEST Model M4853 Double-sided 40/80 Track Disc Drive

Lower cost 40/80 Drives also available – Please call
SWITCH
40
80
Track switch on rear panel
Viglen
Cased with leads

At Viglen's rock bottom prices, everyone can afford to replace inefficient cassette tape units and obtain all the advantages of changing up to discs.

12 MONTH WARRANTY (EXTENDED 2 YEAR WARRANTY AVAILABLE)

£129
(400K 40/80 TRACK)
INC. VAT

Latest Acorn 1.2 DFS (DNFS) Call at factory for free fitting. **£59** (with disc drive only)

Single Drives 40/80 400K	
Single Drive	**£129.00**
Drive + Acorn DFS	**£188.00**
Integral PSU for Single Drive	**£22.00**

Dual Drives 40/80 800K	
Dual Drives	**£258.00**
Dual drive + Acorn DFS	**£317.00**
Integral PSU for Dual Drive	**£28.00**

All offers include

Utilities Disk includes formatting, verifying, BASIC program comparator, disassembler, Epson screen dump, dual catalogue (giving 62 files), large printing and many others.

Comprehensive Manual a fact-filled, 56 page document, includes techniques of loading from cassette to disk. Not available elsewhere

Carriage. Add £12 in each case. Usually despatched next day. Price covers courier-delivery and insurance. Prices include VAT.
Prices correct at time of going to press – Offer subject to availability.

Call in at our Showroom

Saturday
9.30-
2.00pm.

Sales Hotline 01-843 9903
Please call for latest prices, product details and to place credit card orders. Government & Educational Establishments enquiries welcome on this number.

After Sales Line 01-571 6313
For dispatch enquiries, invoice queries, service and all other enquiries.

Post to: Viglen Computer Supplies, Unit 7, Trumpers Way, Hanwell W7 2QA.

Please send me (specify all items) ____________
Add £12 carriage

I enclose Cheque/P.O. for £ ____________
Cheques payable to Viglen Computer Supplies

Name ____________

Address ____________

I prefer to pay by ACCESS/BARCLAY CARD
(Delete whichever is not applicable)

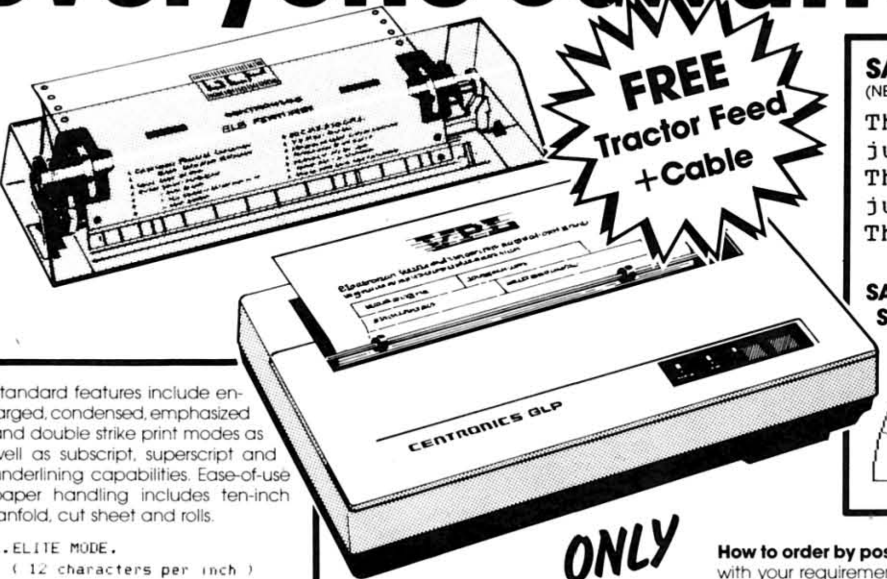
Card No. ____________

Signature ____________

MU7

VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN

The Great Little Printer from Viglen at a price everyone can afford



FREE Tractor Feed +Cable

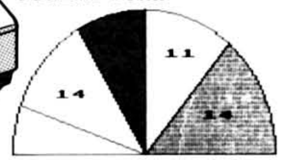
SAMPLE OF N L Q

(NEAR LETTER QUALITY)

```
The quick brown fc
jumps over the laz
The quick brown fc
jumps over the laz
The quick brown fc
```

ACTUAL SIZE

SAMPLE USING EPSON SCREEN DUMP



NOT ACTUAL SIZE

Standard features include enlarged, condensed, emphasized and double strike print modes as well as subscript, superscript and underlining capabilities. Ease-of-use paper handling includes ten-inch fanfold, cut sheet and rolls.

```
1.ELITE MODE.
  ( 12 characters per inch )
2.EMPHASIZED MODE.
3.DOUBLE STRIKE.
  (Characters printed twice)
4.CONDENSED MODE. ( 17 characters per inch )
5.SUPERSCRIPT CHARACTERS
6.SUPERSCRIPT CHARACTERS CONDENSED
7.SUBSCRIPT CHARACTERS
8.SUBSCRIPT CHARACTERS CONDENSED
9.ITALIC CHARACTER SET.
```

ONLY £149

INCLUDING VAT

Viglen Computer Supplies
Unit 7, Trumpers Way
Hanwell W7 2QA
Tel: 01-843 9903

Showroom/Factory open
Mon-Fri 9.30-5.30 and Sat 9.30-2.00

- **All printers come standard with parallel interface**
- **12cps Near Letter Quality**
- **Normal 50cps draft printing**
- **Separate tractor and friction feed**
- **Logic seeking head**
- **Uses normal A4 sheet paper or continuous stationery**
- **Original plus two copies**
- **48 International characters**
- **Subscripts, superscripts and underlining**
- **Also available for IBM.**

THE BEST PARTNERS FOR YOUR COMPUTERS

How to order by post – Simply fill in the coupon below with your requirements. Enclose your Cheque/P.O., or use Access/Barclaycard. Please make cheques payable to VIGLEN COMPUTER SUPPLIES and post to the address shown on the left. Remember to add £8.00 for p&p and insurance. Allow seven days for delivery.

Official Orders from Educational Establishments, Government Departments and Plc Companies accepted.

By telephone – Ring (01) 843 9903. Credit Card holders (Access/Barclaycard only) can purchase by telephone. Please give Card Number, Name, Address and items required.

Credit Cards valid only if signed by the card holder. Address on coupon must be same as card holder.

MU7

To: Viglen Computer Supplies
Unit 7, Trumpers Way, Hanwell, W7 2QA.

Please send me (qty)______ GLP printer(s).

I enclose Cheque/P.O. for £ . . . .
add £8.00 for carriage and insurance.

Tick ✓ whether ☐BBC or ☐IBM

Name. . . . .

Address . . . .

. . . .

. . . .

I prefer to pay by ACCESS/BARCLAYCARD (delete as necessary).

Card No . . . .

Signature. . . . .

VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN VIGLEN

Win on every count, with a Viglen Winchester Drive for your BBC Master Series 128k or BBC B or B+

VIGLEN WILL BE CLOSED FOR THE SUMMER HOLIDAYS FROM AUGUST 1st TILL AUGUST 17th

100% ACORN ADFS COMPATIBLE

Price INC. VAT

20Mb Winchester with Acorn ADFS

£759 (28 megabytes available for an extra £50 inc VAT)

(28Mb, 40Mb, 56Mb and dual versions up to 112Mb available – please call)

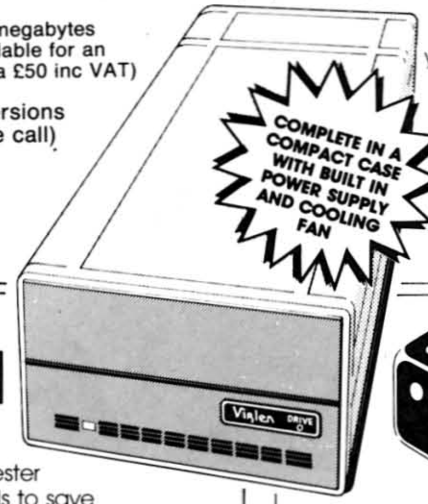
Acorn 1770 Upgrade Kit

Enables you to run your BBC B with the floppy discs in double-density ADFS Mode.

£49.95 INC. VAT

Compability

The Viglen Winchester is ready to plug in and use straight away on a BBC Master Series. On a BBC B or B+, you will need to fit the Acorn ADFS Rom. Viglen believe this is the only truly 100% Acorn ADFS compatible unit currently available. You can use up to two floppy disc drives in conjunction with the unit. Fit the Acorn ADFS to the B+ and the floppies can double their capacities by running in double density mode.



COMPLETE IN A COMPACT CASE WITH BUILT IN POWER SUPPLY AND COOLING FAN

Speed

The Viglen Winchester takes under 2.5 seconds to save 200KBytes, making it at least 10 times faster than the equivalent floppy disc system.

Memory

The Viglen 20Mb Winchester is equivalent in capacity to two hundred 100K floppies or fifty 400K floppy discs.

What is a Winchester?

A Winchester Drive is a sealed unit containing one or more hard discs and works in principle like a floppy disc drive. The discs are permanently rotating at high speed so giving a much faster access time. The discs cannot be changed, but with such a vast memory capacity, it is not usually necessary to do so.

The Viglen Winchester Unit consists of the following:

1 Winchester Drive, Controller Board and special designed power supply fan – all fitted in one compact case. Fan cooling is essential for all Winchesters.
2 Acorn ADFS Rom **3** Acorn ADFS Manual
4 Acorn ADFS Utility Programs
5 Winchester User Guide
6 Additional Utilities on the Winchester including Formatter and Verifier.

The dice must be loaded in favour of

Viglen

How to order

Simply fill in the coupon below. Remember to add £12.00 carriage, packing and insurance, and allow seven days for delivery. Credit Card holders may order by phone.

Showroom open
Mon – Fri 9.30-5.30
Saturday 9.30-2.00

UXBRIDGE RD.
A4020
BOSTON MANOR
BOSTON ROAD
M4
Free parking available
GREAT WEST RD
A4

Tel: 01-843 9903

Viglen Computer Supplies, Unit 7, Trumpers Way, Hanwell, London W7 2QA. MU7
Official Orders from Educational Establishments, Government Departments, and Plc Companies accepted.

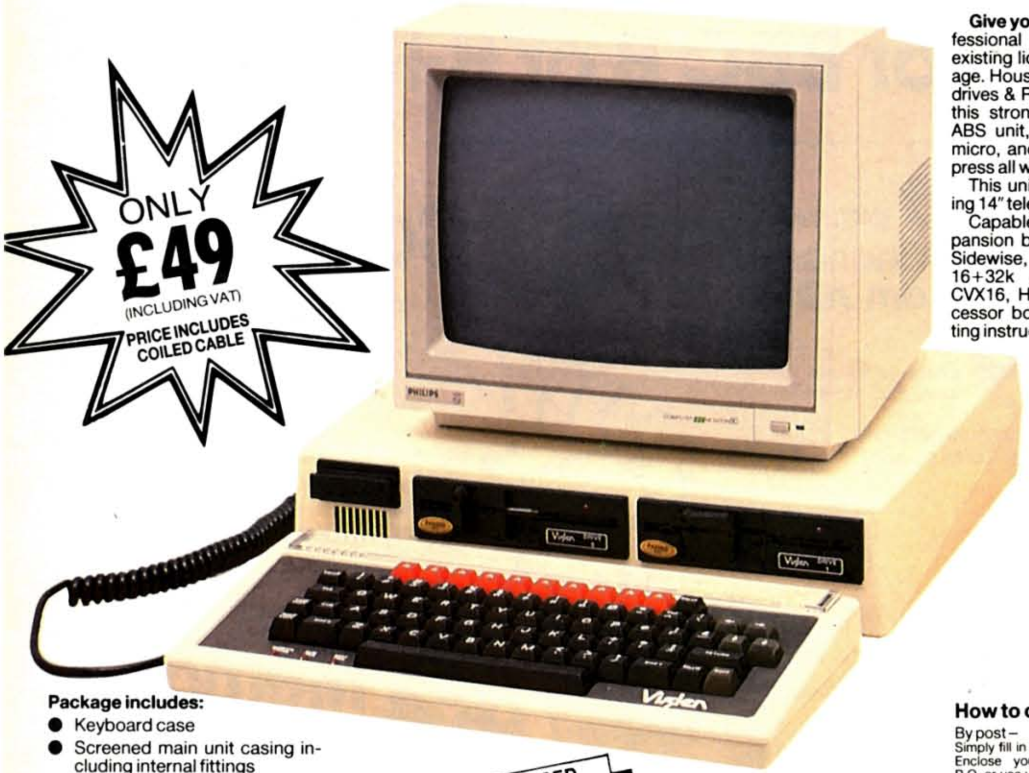
Please send me (quantity)____ Winchester Drives. I own a ☐BBC B, ☐B+, ☐Master, ☐BBC B with 1770 DFS ✓ **Tick**
I own a Master and would prefer a Master Ref. Manual 1 instead of the Acorn ADFS Kit ☐
I enclose Cheque/P.O. to VIGLEN COMPUTER SUPPLIES for £.................. add £12 for p & p and insurance.
Name...
Address...
....

I prefer to use ACCESS/BARCLAYCARD (delete as necessary)
Card No.................................
Signature.................................
Expiry Date.................................
Overseas Credit Card Holders must include Expiry Date of Card. Credit cards valid if signed by card holder. Address on coupon must be same.

GIVE YOUR BBC THE PC LOOK

WITH THE Viglen PROFESSIONAL CONSOLE UNIT (P.C.U.)

ONLY
£49
(INCLUDING VAT)
PRICE INCLUDES COILED CABLE


PHILIPS
Viglen

Give your BBC Micro System the professional PC-look by replacing your existing lid with this smartly styled package. House your computer, monitor, disk drives & ROM cartridge system neatly in this strongly constructed, high impact ABS unit, colour matched to the BBC micro, and give yourself an outfit to impress all who see it.

This unit will support monitors including 14" television sets.

Capable of accepting most internal expansion boards such as Solidisk, ATPL Sidewise, Midwich 16, RAMAMP 16+32k Exprom, Computer Village CVX16, HCR Sideways, 6502 2nd processor boards. Fully ventilated. Full fitting instructions.

DEALER
ENQUIRIES
WELCOME.

Viglen

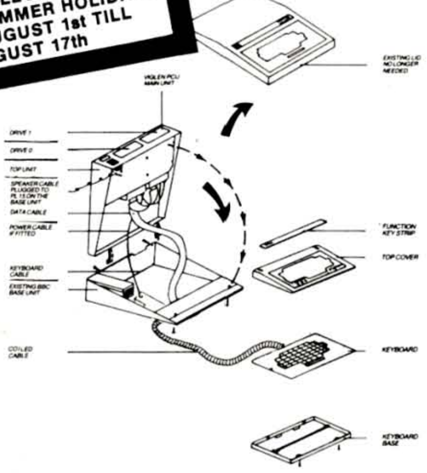
Package includes:

- Keyboard case
- Screened main unit casing including internal fittings
- 2.0 metre coiled cable to connect main unit to keyboard
- Blanking plates included to blank out disk drive aperture
- Keyboard label

Accessories: (prices inc. VAT)

1.	2.0 metre coiled cable on its own	£15
2.	Dual-drive data cable	£9
3.	Dual-drive power cables	£5
4.	Special internal switch mode power supply kit capable of running two half-height drives cool	**£29**
5.	Fan kit, only necessary in extreme cases	£35
6.	Fitting available from	£15
7.	Extension keyboard on its own	£29
8.	Also available with single or dual drives ready fitted	*Price on Application*

VIGLEN WILL BE CLOSED FOR THE SUMMER HOLIDAYS FROM AUGUST 1st TILL AUGUST 17th


EXISTING LID NO LONGER NEEDED
VIGLEN PCU MAIN UNIT
DRIVE 1
DRIVE 0
TOP UNIT
SPEAKER CABLE PLUGGED TO PL 15 ON THE BASE UNIT
DATA CABLE
POWER CABLE IF FITTED
KEYBOARD CABLE
EXISTING BBC BASE UNIT
FUNCTION KEY STRIP
TOP COVER
COILED CABLE
KEYBOARD
KEYBOARD BASE

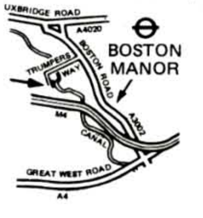
How to order:

By post –
Simply fill in the coupon. Enclose your Cheque, P.O. or use your Access, Barclaycard. Please make cheques payable to VIGLEN COMPUTER SUPPLIES and post to the address stated.

Allow seven days for delivery. Add £6.00 carriage, packing and insurance.

Or telephone:
01-843 9903
Credit card holders (Access, Barclaycard only) can purchase by telephone. Please give Card No. name, address and items required.
Viglen are also major supplies to educational and government establishments and welcome futher enquiries and orders.

Unit 7, Trumpers Way,
Hanwell W7 2QA
Tel: 01-843 9903
Personal callers:
Monday-Friday 9.30-5.30pm
Saturdays
9.30-2.00pm.


UXBRIDGE ROAD
A4020
BOSTON MANOR
TRUMPERS WAY
BOSTON ROAD
M4
CANAL
A3002
GREAT WEST ROAD
A4

Free parking available

Post to: VIGLEN LTD., UNIT 7, TRUMPERS WAY, HANWELL, LONDON W7 2QA. **Telephone: 01-843 9903**

Please send me______(Qty) VIGLEN PC Unit(s) Plus Accessories ____________________ State ref numbers

I enclose Cheque/P.O. for ____________________ Please add £6 for postage, packing and insurance.

I prefer to pay by ACCESS/BARCLAYCARD* Delete whichever is not applicable

Card No.____________________ Signature ____________________

Name ____________________

Address ____________________

MU7

____________________ Postcode____________

Tel. No. ____________________

Credit Cards valid if signed by Cardholder.
Address below must be the same as card holders.

VISA

BLOCKBUSTER Disc Drive Sale

1986 BARGAINS AT 1985 PRICES

This amazing Opus summer sale includes top quality disc drives and our famous DDOS interface at unbelievably low prices. Just look at these price shattering offers.

ONLY £159.95
500K DUAL DRIVE SYSTEM
5¼" dual single-sided 40 track disc drive plus double density disc interface 350K formatted capacity.

ONLY £99.95
250K SINGLE DRIVE SYSTEM
5¼" single-sided 40 track disc drive plus double density disc interface 175K formatted capacity.

Opus.

These are complete disc drive systems for the BBC micro – No extras required. Both our systems combine the very latest in Japanese disc drive technology with the unbeatable Opus 2-year guarantee. With super reliable direct drive mechanisms, low power consumption and fast track to track access times they represent fantastic value.

Each drive is supplied with the easy to fit Opus DDOS – probably the most advanced double density disc interface available. It uses the same 1770 disc controller chip as the BBC B + making it compatible with most leading software – phone for details. Utilities are included on ROM, the system handles tape to disc transfers and its powerful machine code operating system gives you up to 248 files. The perfect partner for any BBC disc drive system.

Our sale prices even include VAT, 2-year warranty and guaranteed 72-hour FREE delivery. You won't buy better, you can't buy cheaper, but hurry we can't hold these prices for ever! To order your system simply post the coupon or ring Opus now on 0737 65080 – we'll give you full details of the other disc drive bargains in our range. Generous education and dealer discounts – enquiries to Martin Brefitt on our main Opus number 0737 65080.

Opus. Opus Supplies Ltd

Opus Supplies Limited,
55 Ormside Way,
Holmethorpe Industrial Estate,
Redhill, Surrey.

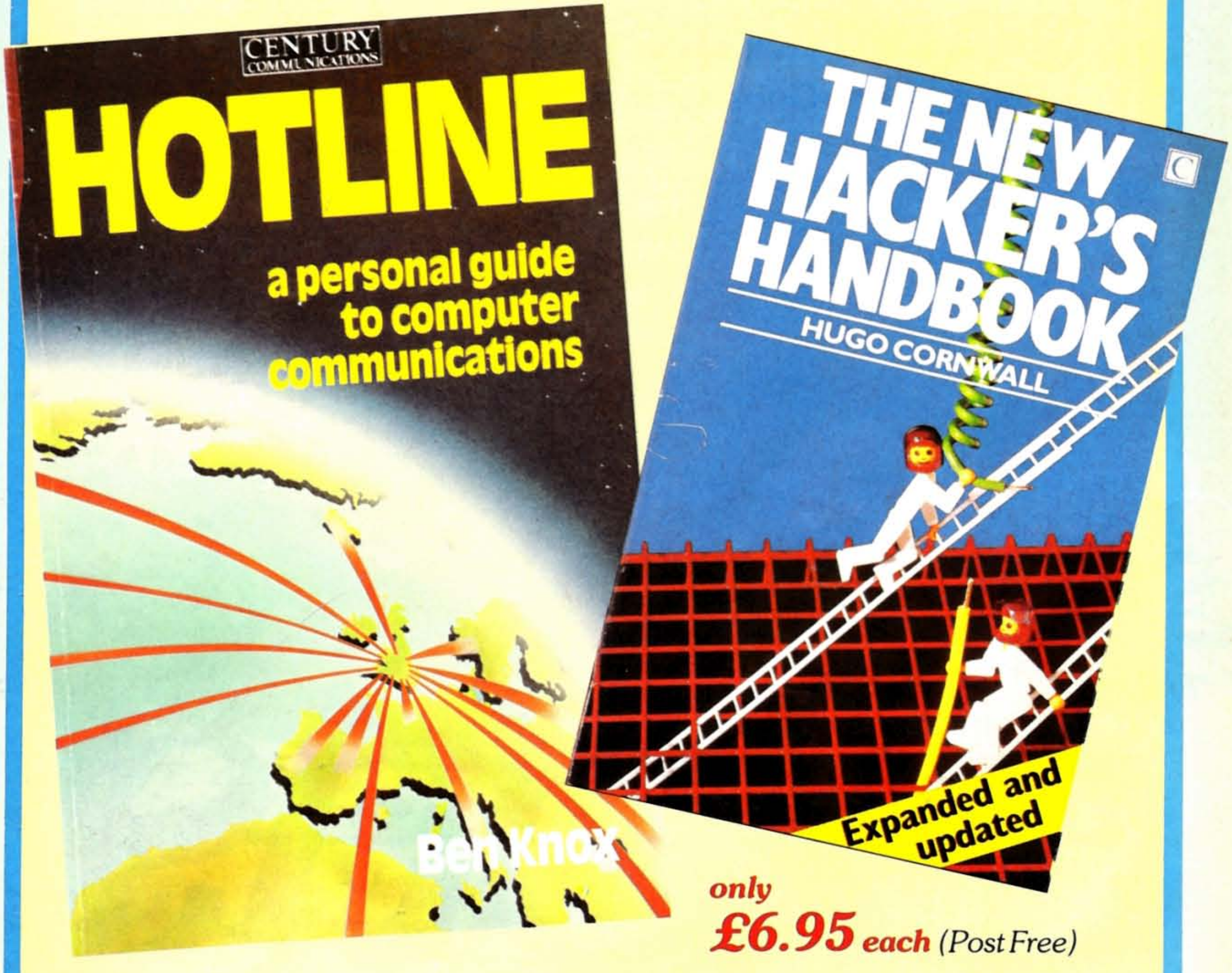
Please rush me the following: (All prices include VAT & carriage)
☐ **Single Drive System(s) at £99.95 each**
☐ **Dual Drive Systems(s) at £159.95 each**
(Please tick box where applicable)

I enclose a cheque for £ ______ or please debit my credit card account with the amount of £ ______

My Access ☐ Visa ☐ no. is: (please tick)
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Name ______
Address ______
______
______ Telephone ______

Two books that tell you all you want to know about communications ...


CENTURY COMMUNICATIONS
HOTLINE
a personal guide to computer communications
Ben Knox
THE NEW HACKER'S HANDBOOK
HUGO CORNWALL
C
Expanded and updated

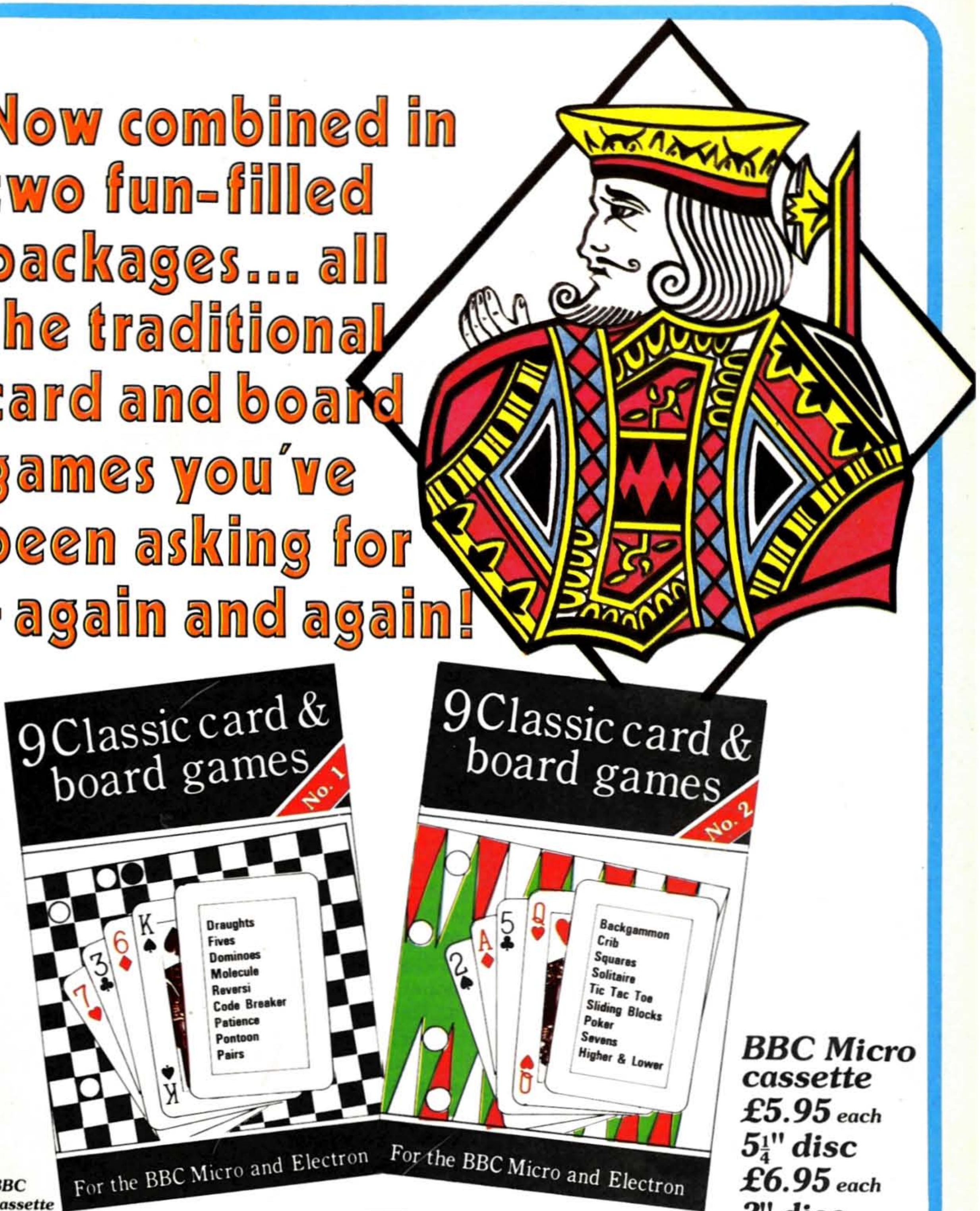
only
***£6.95** each* *(Post Free)*

HOTLINE is a practical guide to the fascinating world of communications, written by one of Britain's top experts, Ben Knox. Even if you've only just started using a computer it will soon have you linking into networks and databases all over the world! Full of useful names, addresses and telephone numbers – and lots of helpful hints and tips.

THE NEW HACKER'S HANDBOOK is a complete revision of one of the most talked-about books ever written about the controversial subject of hacking – including pointers on how to go where you're not really supposed to go! Subjects include sophisticated hacking techniques, new methods of computer security, a guide to trouble-shooting, pages of telephone numbers you can experiment with – and stories of classic hacking hoaxes.

TO ORDER TURN TO THE FORM AT THE BACK OF THIS SECTION

Now combined in two fun-filled packages... all the traditional card and board games you've been asking for - again and again!



9 Classic card & board games

No. 1

Draughts
Fives
Dominoes
Molecule
Reversi
Code Breaker
Patience
Pontoon
Pairs

For the BBC Micro and Electron

9 Classic card & board games

No. 2

Backgammon
Crib
Squares
Solitaire
Tic Tac Toe
Sliding Blocks
Poker
Sevens
Higher & Lower

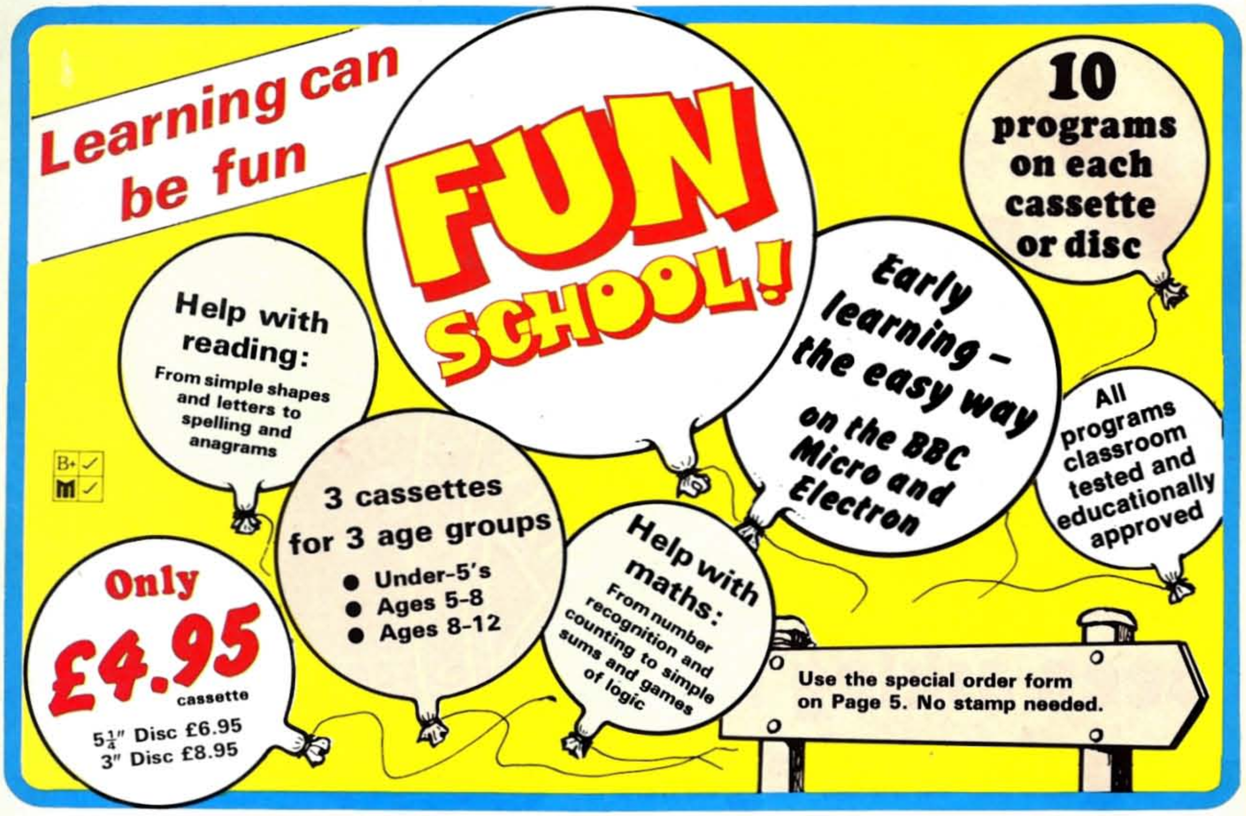
For the BBC Micro and Electron

BBC cassette can also be used on the Electron

B+ ✓
M ✓

BBC Micro cassette
£5.95 *each*
5¼" disc
£6.95 *each*
3" disc
£7.95 *each*

2


Learning can be fun
FUN SCHOOL!
10 programs on each cassette or disc
Help with reading: From simple shapes and letters to spelling and anagrams
Early learning – the easy way on the BBC Micro and Electron
All programs classroom tested and educationally approved
B+ ✓
M ✓
3 cassettes for 3 age groups
● Under-5's
● Ages 5-8
● Ages 8-12
Help with maths: From number recognition and counting to simple sums and games of logic
Only £4.95 cassette
5¼" Disc £6.95
3" Disc £8.95
Use the special order form on Page 5. No stamp needed.

Educational Computing on the BBC Micro

9 FULL LENGTH programs designed to stimulate, educate and entertain – both in school and at home

THE MICRO USER
Education Special
Logo on the BBC Micro
An in depth study of the learning language
Programs to help with early reading · spelling · factors punctuation · angles · simple sums
DIY DATABASE FOR JUNIORS
15 software packages reviewed
9

B+ ✓
M ✓

The Micro User Education Special Volume I has now sold out But Volume 2 is still available

It contains nine full length programs written to the highest standards and each picked to combine educational worth with sheer enjoyment. The nine programs cover topics from early reading and simple sums to the rules of punctuation and angle estimation – and there's an excellent introductory database.

The magazine contains the complete listings of all the programs together with advice on how they can be adapted to cater for individual needs.

Fun Factors: *Arcade style factor learning.* ***Windmill:*** *Word, number and colour recognition.* ***Angler:*** *Angle estimation fun.* ***Spelldroid:*** *Learn to spell with our friendly robot.* ***Tortal:*** *Teach and test the rules of simple addition.* ***Discovery:*** *A strategy based phrase identification game.* ***Punctuation:*** *Test and teach the rules of punctuation.* ***Junior Database:*** *A comprehensive database for the young learner.* ***Chinese Takeaway:*** *Teach and test the rules of simple subtraction.*

Education Special Volume 2	
Magazine	£1.50
Cassette	£4.95
Cassette and Magazine	£6.00
5¼" Disc	£6.95
5¼" Disc and Magazine	£7.95
3" Disc	£8.95
3" Disc and Magazine	£9.95

All the programs from the last 12 months of The Micro User are available on tape and disc!

JULY: Fly, an arcade spectacular. **Draughts,** a superb version. **Compox,** 3D noughts and crosses. **Double Height,** large characters in Modes 0-6. **Clock,** alarm utility. **Compacter,** compress Mode 2. **Inside Basic,** basic routines in machine code. **RAMpage and RAMsave,** sideways RAM utilities. **Video,** graphics to music.

AUGUST: Harbour Command, protect a Cornish town. **Fruit Machine,** a gambler's favourite. **Mouse Organ,** AMX mouse music utility. **Flash,** alternative flashing colours. **String Formatter,** prevent end of line word splitting. **M/C Games,** random number and key detection routines.

SEPTEMBER: Ball Lightning, tame the lightning. **Quarters,** game of skill. **6502 Games,** a simple arcade game. **Variable Lister,** track your variables. **Smiley Hunt,** Al's game. **Error handling,** the vital routines.

OCTOBER: Karate, superb martial art action. **Solitaire,** all-time favourite. **Scroller,** text scroll utility. **Case,** an ON PROC command. **Disc Scan,** search for disc files. **Adventure,** avoid the vampire.

NOVEMBER: Whodunnit, solve the murder. **Gloop Gulp,** zany arcade action. **Basic Analyser,** take the drudgery of debugging. **Wordwise F/keys,** get the most from your word processor. **Sideways,** sideways screen clear. **New Modes,** Modes 8, 9 and 10. **Disabler,** prevent star command clashes.

DECEMBER: Wizard's Castle, recover a diamond from the necromancer's lair. **Squares,** 'join the dots' strategy. **McBase,** powerful database. **Alphabet Train,** early spelling. **Basic Analyser,** the vital cross reference tables. **Wordsquare Creator,** to create your own puzzles. **Dumper,** how your programs affect memory. **Subhunt,** the final listing. ***Plus the listings from Body Building and Adventures.***

JANUARY 1986: Megaroids, exciting space action. **Claustrophobia,** alone in a maze. Can you get out of the maze in one piece? **Fives,** mind bending noughts and crosses. **Music Editor,** translate musical notation.

Wordsquare Solver, the program to help you solve them. **Find and replace,** find and replace any item of text in a Basic listing. **Discopy,** copy and/or rename files. **S-sound,** sounds into electronic effects. **Alice,** another baffling problem.

FEBRUARY: Tipaka, can you escape the Logan King's castle in one piece? **USS Endeavour,** fast and exciting space invader action, and it's in machine code. **Ploy,** hours of enjoyment with this brain teasing strategy game. **Up-and-downloader,** an invaluable programming aid for loading and saving. **Fast Verify,** a superb utility for verifying saved disc files. **Disc Assembler,** assemble multi-part source files to disc. **Shift and Echo,** more electronic effects from the Body Building course. **8271,** using OSWORD to format a disc in a special way. **Elite Cheat,** the easy way to the top.

MARCH: Morris Miner, collect the keys and escape the mine before your time runs out in this levels and ladders spectacular. **Poster Puzzler,** a sliding block simulation to provide hours of fun for the whole family. **Quicksort,** a fast machine code sort routine that uses and teaches recursion. **Character Sets,** a program to create and display your own fonts. **8271,** four programs to complement the last article in the series. **Sound Sampler,** two programs from the Body Building course. **Eleusis,** another mind bending puzzle from Alice.

APRIL: Ghouls of Azzod, can you escape from Azzod manor with its monsters, moving floorboards and venomous plants? **Mousetrap,** you'll need skill, strategy and a lot of luck in this very simple but infuriating chase game. **Character Sets,** outputting characters using Epsom compatible bit-imaging. **Special Fonts,** create interesting displays with this utility to give alternative fonts. **Notepad,** forget scraps of paper with this electronic jotter. **Hexer,** a hexadecimal loader for use in the machine code series. **Hyperspace,** another puzzler from Alice. **While Wend** and **While Wend Demo,** two listings from the mail pages.

MAY: Cavern Quest, can you collect the diamonds before your oxygen runs out, avoiding the falling boulders as you go? **4-Site,** a mindbending 3-dimensional adaptation of noughts and crosses needing foresight. **Catalog II,** disc operations achieved quickly with a single key press. **Taming the Tube,** turning the 6502 second processor on and off by software. **Character Sets,** creating slim characters for use in Modes 2 and 5. **Alice,** another intriguing puzzle from our adventurer.

JUNE: Pendragon, alone in a sugar factory, can you keep the evil yellow perils away from the sugar cubes, while positioning the four diamonds? **Spacebase,** as commander of a solitary spacebase you must defend Earth from the invading hoarde of aliens. **Rainbow,** whether doodling or creating works of art, this lightpen graphics utility will keep you happy for hours.

JULY: Royal Wedding, celebrate the most exciting royal event of the decade with this superb sliding block puzzle. **Dual Catalog,** feel restricted with the Acorn DFS maximum of 31 files? This utility to provide 56 on one side of a disc will solve your problems. **Viewgen,** what you see is what you get with this printer driver generator for View. ***PLUS digitised picture of Andrew and Sarah (disc only).***

Save wear on your fingers and ensure all your programs are error-free by using our monthly tapes or discs. They are only:

£4.25 cassette
£6.25 5¼″ disc
£8.25 3″ disc

You can also take out a year's subscription and have them posted to you each month.

Cassette	**£35**
5¼″ disc	**£50**
3″ disc	**£65**

•See order form for overseas prices.

B+ ✓ M ✓

THE MICRO USER Bibliography has been updated!

B+ ✓ M ✓

NEW FEATURES
Global or selective printing.
Select month for search to start.
More on-screen messages/instructions.

40 track 5¼″ disc

March '83 to August '84 **£7.95**
1062 references – 66k of data.
Max search time 12 seconds.

September '84 to August '85 **£7.95**
1227 references – 85k of data.
Max search time 13 seconds.

September '85 to April '86 **£7.95**
782 references – 58k of data.
Max search time 9½ seconds.

80 track 5¼″ disc

March '83 to August '85 **£11.95**
2289 references – 151k of data.
Max search time 24 seconds.

September '85 to April '86 **£7.95**
782 references – 58k of data.
Max search time 9½ seconds.

Updates of existing 40/80 track discs are available at **£3** by returning your 5¼″ disc.

Keep your copies neat and complete

NOW EVEN BIGGER

These handsome binders are bound in PVC with the Micro User logo in gold blocking on the spine.

£4.25

THE MICRO USER

Your BBC Micro needs protecting!

Our luxury dust cover is made of soft pliable water-resistant transparent vinyl, bound with strong cotton and decorated with the *Micro User* logo in black.

SAVE up to 50% on insuring your BBC Micro, monitor, disc drives and printers

The Micro User has negotiated special terms with one of Britain's biggest insurance companies to cover your BBC Micro system (including all peripherals) against theft, breakdown or accidental damage.

No insurance package has ever before offered you breakdown cover.

Your system is covered while it is in your own home, while it is temporarily elsewhere, and even when it is in transit – but only within the UK.

Examples of our special prices:

System worth	*Premium*
£200	**From £10**
£500	**From £16**
£1,000	**From £35**

Different rates apply to rural, urban and metropolitan areas.

A scheme is also available for businessmen which provides additional cover. Details on application.

Cornhill Insurance plc. have underwritten this offer.

Exclusive offers for subscribers to The Micro User

SAVE 50% on this classic book about BBC Basic

Mike Bibby
Getting started in BBC Basic on the BBC Micro & Electron
DATABASE PUBLICATIONS

Based on the highly praised series for beginners in *The Micro User*, 'Getting started in BBC Basic' takes the reader through the fundamentals of writing programs.

Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality – good programming style.

By working through its many examples, the reader will gain a clear insight into structured programming and will quickly acquire the ability to use structured techniques in creating his own programs.

Was £5.95

NOW £2.95

Selected sale items from

THE BEEB BODY BUILDING COURSE

50% OFF ALL ITEMS!

Kit Packs

½ PRICE OFFER

No. 3	Dual cassette system	£4.99
No. 7	Pendulum behaviour/ capacitor discharge	£7.75
No. 8	Sound to pattern converter	£8.25
No. 9	Real time clock	£14.25

SPECIAL OFFER!

Fully assembled sound to pattern converter

Was £22.30 **Now Only £9.99**

Connect this unit between your BBC Micro and cassette recorder, insert your favourite music cassette and be mesmerised by the pulsating patterns on your TV screen.

Whilst stocks last!

ULTRON LTD.

ULTRON DISKS 5.25" D/S D/D 96TPI 10's **10.95**
Our own branded disks are of the highest quality and manufactured to the highest specification and with hub rings.

BULK DISKS

	50's	100's	250's	500's
5.25" S/S D/D 96TPI	**30.00**	**55.00**	**130.00**	**250.00**
5.25" D/S D/D 96TPI	**35.00**	**65.00**	**140.00**	**270.00**
	25's	50's	100's	
3.50" S/S 135TPI (½ m/byte)	**43.75**	**85.00**	**165.00**	
3.50" D/S 135TPI (1 m/byte)	**48.75**	**95.00**	**180.00**	
	10's	50's		
*3.50" S/S D/D 135TPI (½ m/byte)	**19.95**	**72.50**		
*3.50" D/S D/D 135TPI (1 m/byte)	**25.95**	**99.50**		

*with free library case.
3.00" Maxell/Amsoft/Panasonic 10's **34.95** In stock now

JOYSTICKS
MOONRAKER 1 **4.95** QUICKSHOT II **5.95**
LOCKABLE STORAGE BOXES 3.50" & 5.25" IN STOCK
All prices incl. VAT and P&P (Except Lockable Storage boxes)

To order please phone or write to:
ULTRON LTD, PO BOX 907, LONDON SE15 2BB. (01-732 2828)
(Mail Order only) Ansaphone line available (8.30-4.30) manned line onwards

NEW BBC B Memory Grabber RESTART SYSTEM

Cassette to Disc

This Hardware memory grabber SYSTEM will Transfer virtually any program you care to try straight to disc, and is simple to install without soldering. When installed programs can be stopped and saved directly to disc at any time by the push of a button.

- **Save any position in a game ready to Resume where last left off.**
- Save stopped screens to disc ready to print via your dump routine.
- **High-Score tables can be saved on disc ready to reload at any time.**
- Change Screen colours, Modes, Video Crtc • Pause facility built in
- No Sideways Roms sockets Required • Automatic Disc Menu software.

This unit is compatible with a BBC B Micro with Acorn standard single density DFS/DNFS (or Watford DFS) and fitted with Sideways Ram . . . (If you don't have sideways ram fitted we can supply an 8k Ram chip).

SPECIAL INTRODUCTORY PRICE £19.99
(with 8k Sideways Ram chip £26.99)

All inclusive prices, rush your order to:
QWERTY SOFTWARE
Dept MU1, 44 Premier Avenue, Grays, Essex RM16 2SD
State 40 or 80 track disc

S.P. ELECTRONICS

ALL IN STOCK

BBC SPECIALISTS

BBC MASTER 128	**£499.00**
BBC 'B'	**£299.00**
BBC 'BD'	**£350.00**
BBC 'BDE'	**£375.00**
Cumana CD800S (800K) 2 x 80 track DS drive with PSU	**£299.00**
Cumana CDX800S (800K) 2 x 80 track DS drive without PSU	**£244.00**
Disc Operating System	**£96.00**
Disc Drives	**from £99.00**
G3WHO Rtty Program (Tape)	**£7.50**
G3WHO Rtty Program (Eprom Version)	**£20.00**
Circuit board for Rtty decoder Mk3 (inc. instructions)	**£10.00**
Canon Dot Matrix 160cps NLQ Printer	**£299.00**
Printer Cable (Centronics)	**£12.90**
Disc Doctor	**£33.00**
WORDWISE Word Processor	**£33.00**
Slow Scan TV Circuit Board & Program (inc. instructions)	**£17.50**
ADFS	**£29.90**
1770 DFS Kit	**£49.90**

We are Acorn approved dealers & repair specialists

Wide selection of software, books, leads, plugs, etc. All prices only
SAE for full list. All available Mail Order while stocks last.

48 Linby Road, Hucknall,
Notts. NG15 7TS
Tel: 0602 640377

VISA

Educational & institutional orders welcome

(all prices include VAT)

Carriage extra

TITLE YOUR VIDEOS WITH THE BBC

A full titling programme, originally written to title our own video productions, is now available for all BBC-B owners. It's features include :

- 4 large fonts including Old English (ideal for weddings).
- Proportional spacing.
- Under and overlining.
- Drop-shadow and use of all 16 colours in Modes 1 or 2.

Easy to use with full instructions, plus advise on other aspects of BBC-B titling. Disc only.

Please state 40 or 80 Track

Send £15.75 to:
COASTAL TAPE LTD
PO Box 135, London N20 0HF

Leigh Computer Systems

Authorised Acorn Service Centre. ACT and Ferranti Computer Dealer

COMPUTERS
BBC Master £499.00
Plus Amstrad, Atari ST, Advance, Ferranti, ACT, Olivetti, Sperry, North Star.

DISC DRIVES
OPUS 5802 .... £129.00
5802SD ... £159.00
5802D £269.00
Challenger £199.00
Opus DDFS £45.00
Plus many others
Cumana 10Mb Hard Disc £699.00
Cumana 20Mb Hard Disc £799.00
OS9 Interface £695.00

PRINTERS
MT80 .... £199.00
Epson LX80 +Tractor £249.00
Epson GX80 ..... £245.00
Epson FX85 .... POA
Epson FX105 .... POA
Plus rest of Epson range
Canon 1080A ... £249.00
Canon 1156A ... £379.00

Special Offer
Kaga Taxan £259.00

DAISYWHEEL PRINTERS
Epson DX100 ...... £379.00
Juki 6000 .... £209.00
Juki 6100 .... £369.00
Juki 6300 .... £899.00
QuenData £175.00
Plus Silver Reed range

MONITORS
Microvitec 1431 .. £199.00
Microvitec 1451 ... £269.00
Microvitec 1441 ... £399.00
Philips 7502 green .. £84.00
Philips 7522 amber . £89.00

EPROMS
27128 .... £2.65
2764 .... £1.95
8271 .... £39.00

Plus Full Range of Add-Ons, ROM software etc.

EDUCATIONAL ORDERS SUPPLIED

– Price list available on application –

P&P **80p** small items. **£7** large items

All Prices include VAT

75 CROSS STREET
SALE
MANCHESTER
Telephone: 061-905 2144

7 COVENTRY ROAD
HINCKLEY
LEICS.
Telephone: 0455 612139

CONTRACT BRIDGE
BRIDGE-MENTOR II

DISC OR TAPE!

"the best offering we have seen for the bridge player so far" **BRIDGE CLUB REVIEW**

"The internationally acclaimed system for the BBC/ELECTRON that can really improve your standard of play"
Rewritten for disc with many NEW features!

Practice your bidding: Perfect your card-play: Create your own archive of interesting hands

With high resolution colour graphics and sound, BRIDGE-MENTOR II guides you, step-by-step, through expertly analysed hands. A host of features including the spectacular "AUTOPLAY" option. The package now includes the famous "Challenge" hands archive . . . in total-over 60 testing hands to improve your game . . . with unlimited scope for more !!!

10
J
Q
K
A
BRIDGE-MENTOR

Original Cassette version £16.00

For Individual Practice, Analysis and Archiving

BRIDGE-MENTOR II £17.50
(State 40/80 track 5¼" disc or tape to disc version)

For all BBC/ELECTRON models with 32K or more and most DFS/DDFS. Disc version available on Tape for transfer to non-standard disc systems.

Cheques to:- MINIC BUSINESS SERVICES,
12 WOBURN CLOSE,
BUSHEY, HERTS WD2 3XA.

FAST REPAIRS FOR THE BBC MICRO BY

MICRO FIX

THE ACORN APPROVED SERVICE CENTRE
191 FRESTON ROAD
LONDON W10 6TH
PHONE: 01 968 9214

- Repair centre for BBC micros, disc drives, monitors, printers etc.
- BBC Micro repairs: Average cost £12-£20.
- Complete disc drive calibration: £15/drive.
- Upgrades: Disc – £85 + £10 installation.
  Econet – £50 + £15 installation. Discount for 5 or more upgrades.
- Other upgrades carried out as required.
- All repairs fully guaranteed.
- Extended warranties available on all your equipment.
- Computer equipment: Lowest prices for Cumana disc drives, Acorn computers and peripherals.
- Acorn authorised Econet support centre. Expert installations and trouble shooting.

RING 01-968 9214 AND ASK FOR
MARK DUFFILL OR DEREK MULLINGS

SPIDER 2
REAL-TIME CONTROL FOR THE BBC MICRO

Watch the SPIDER!

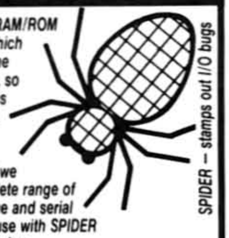
- *Powerful new BASIC commands for invoking PROCs from the User Port, Serial Port or the Keyboard.*
- *8 independent countdown timers.*
- *Easy to install with no soldering.*
- *Comprehensive manual supplied.*

New SPIDER 2 features

- *Special keywords for controlling the Serial Port.*
- *Professional implementation of Foreground/Background processing.*
- *Reaction timing and pulse trains accurate to 0.1 milliseconds!*

from £65 including VAT

SPIDER 2 is a RAM/ROM combination which uses none of the BBC's memory, so BASIC programs are unaffected. The BBC B+ is fully supported and we supply a complete range of digital, analogue and serial interfaces for use with SPIDER using the 1MHz bus. Ask now for details.



SPIDER – stamps out I/O bugs

Paul Fray Ltd
Willowcroft, Histon Road, Cambridge CB4 3JD
Telephone: (0223) 66529

16K & 32K RAM modules

- For use with the standard BBC model 'B' fitted with **TAPE, DISC** or **NETWORK** filing systems.
- Plugs into any one of the BBC's four sideways ROM sockets. 32K occupies two sockets.
- ATPL SIDEWAYS expansion board versions available.
- Write switch fits neatly to rear of BBC case.
- No soldering. Step by step instructions.
- Small size L.35 W.18 H.14mm, fully encased.
- Module uses low power static c-mos RAM.
- Software supplied on tape/disc 40 or 80 Track is compatible with BASIC I/II & NETWORK systs.
- Menu driven software options include:

(L) LOAD RAM — Loads ROM data from tape/disc
(S) SAVE ROM — Saves ROM data to tape/disc
(P) PROTECT — Protect ROM image data
(V) VIEW ROMS — Displays titles & sockets
(*) OS COMMAND — *CAT etc.
(Q) QUIT — Exits program

write switch
16K RAM
clip-on write line

16K £22
32K £35

Please state: disc/cass.
Model 'B', 'B+' or ATPL

FREE P&P – Send cheques/PO/Official orders to:
Terrell Electronics, 7B Essex Gardens,
Hornchurch, Essex RM11 3EH.
Tel: (04024) 71426

EDUCATIONAL DISCOUNTS

Advertisers Index

21st Software 70
Abbadish Computer Systems 113
Access Software 105
Advanced Tech. 114
AGF 129
Alligata Software 147
B & S Computing 128
Beebug 92
Beebugsoft 2, 3, 35
C & F Associates 113
Centec Electronic Systems 129
Chalice 82
CJE Micros 66
Coastal Tape 145
Comlex 120
Computer Concepts 22, 23
Comtec 108
CP Micro Systems 107
Datastore 128
Derrick Daines 113
Design People Software 107
Disking 73
Doctor Soft 95
Flora Electronics 146
Goto Computers 105
GPD Systems 113
HSV Computer Services 106
Jaysoft 87
John Penn Discount Software 146
Keyzone 108
Kosmos 119
Leigh Computer Systems 145
Linear Graphics 47, 49
Logic Sales 120
Mancomp 119
Manor Court 95
Micro Fix 146
Micronet 127
Micro Resources 90
Microworld 24-29
Mighty Micro 107
Minic Business Services 145
Miracle Technology 14
Morley Electronics 74
Number One Systems 108
Opus 53, 79, 137
P&H Electronics 126
Paul Fray 146
Pineapple Software 119
Printerland 105
Qual-Soft 50
Qwerty Software 145
RCS 115
Reflex Magnetics 19
SP Electronics 145
Select Software 128
Shards Software 129
Silicon City 108
Slippery Slug 47
Software Services 129
Solidisk Technology 6-10
Speedy Soft 95
Superior Software 148
Technomatic 36-44
Terrell Electronics 146
Twillstar 80, 81
Ultron 145
Viglen 130-136
Vine Micros 100
Watford Electronics 54-65
Weserve 16

BUSINESS INDEX

Carson Developments 15
Clares 12
Contex Computing 15
HI Voltage 2
Micro Media 7
Microdis 16
Microman Computers 4
Minerva Systems 15

AMAZING BARGAINS FOR BBC AND ELECTRON

£3.00 each, any five for **£13.50**, any ten for **£25.00**
Please give alternatives where possible

ALL CASSETTES

BBC
FOOTBALL MANAGER (Add.)
SNOOKER (Vis)
HOBBITT (cass.+book) (MH)
MANIC MINER (A+F)
SWORD MASTER (Ac)
ARROW OF DEATH I (AS)
ARROW OF DEATH II (AS)
WAXWORKS (AS)
FEASIBILITY EXPERIMENT (AS)
10 LITTLE INDIANS (AS)
PERSEUS & ANDROMEDA (AS)
CIRCUS (AS)

BBC/ELECTRON
HEATHROW ATC (Hew)
FANTASIA DIAMOND (Hew)
TALES OF ARABIAN NIGHTS (Inter)

ELECTRON
FOOTBALL MANAGER (Add)
HUNCHBACK (Oc)
EMPIRE (Shd)
SWORD MASTER (Ac)
CYLON ATTACK (A+F)
ARROW OF DEATH I (AS)
ARROW OF DEATH II (AS)
PERSEUS & ANDROMEDA (AS)
10 LITTLE INDIANS (AS)

All programs subject to availability
Postage on one program = 50p, on two or more programs = 75p
Access/Cheques/PO's made payable to:
JOHN PENN DISCOUNT SOFTWARE
Dean Farm Cottage, Kingsley, Bordon, Hants. GU35 9NG
Tel: 04203 5970

DISKETTES (Prices per box of 10 discs)

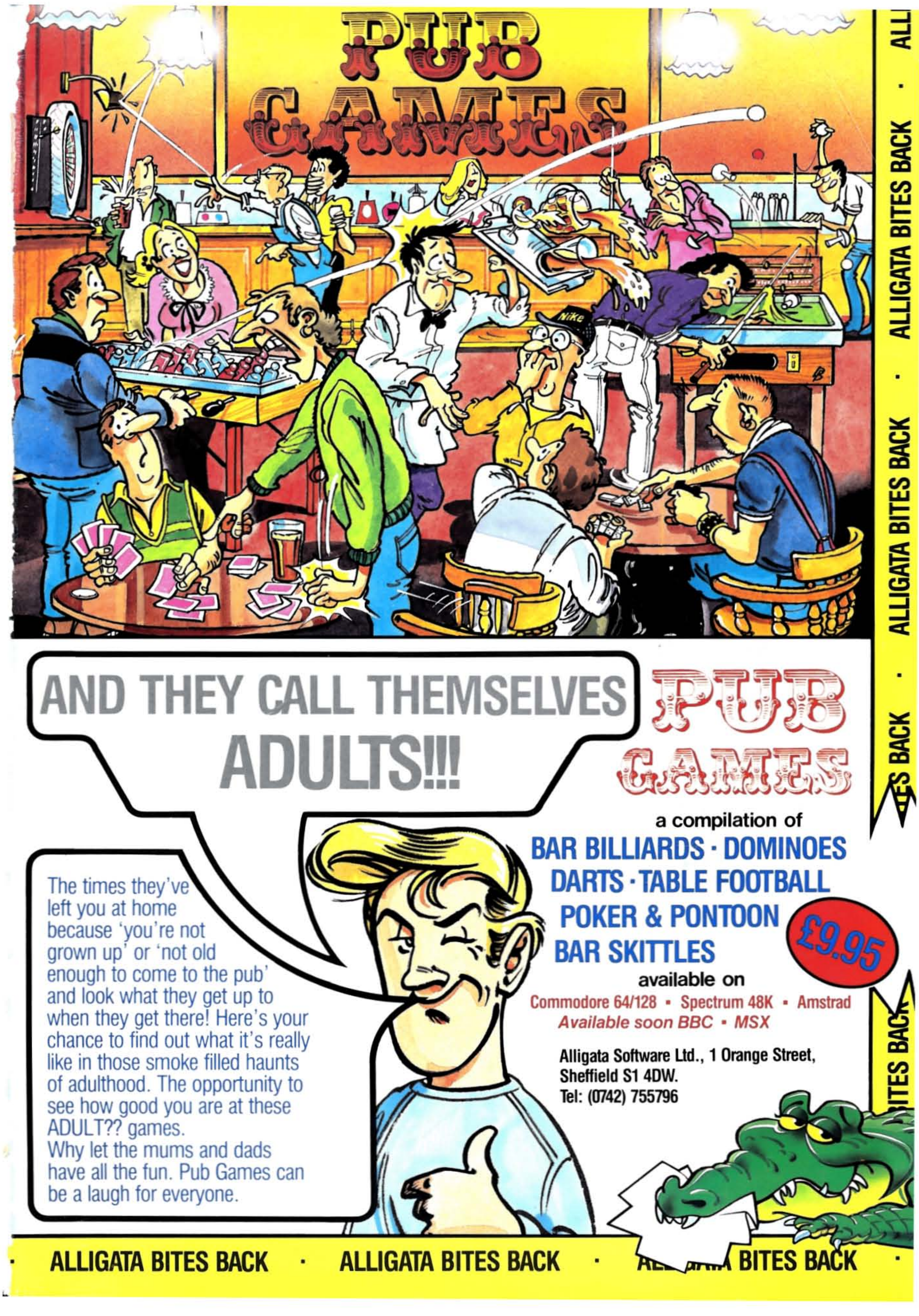
5.25″	SS/DD 48tpi	DS/DD 48tpi	SS/QD 96tip	DS/QD 96tpi
Control Data	£13.00	£15.00	£17.00	£20.00
Nashua (library cased)	£13.50	£16.00	£17.50	£21.00
Maxell	£15.00	£18.00	£18.00	£23.50
3.5″ Diskettes				
Control Data	£23.50	£33.50		
Nashua	£23.50	£33.50		
Sony	£23.50	£33.50		

UNBRANDED DISCS
5¼″
SS/DD 48tpi £8.00
DS/DD 48tpi £10.00
DS/QD 96tpi £11.50
3½″
SS/DD 135tpi £19.00
DS/DD 135tpi £25.00
5¼″ × 10
Plastic Library Cases £1.50
LISTING PAPER
11″ × 9½″ Micro perforated
2000 sheets £11.00
(£3.00 p&p)
ALL PRICES INCLUDE
VAT AND P&P

HITACHI EPROMS

2764-250ns	£2.25
27128-250ns	£3.00
27256-250ns	£5.50
27C256-250ns	£7.00
4164-15	£1.00
4129-15	£5.00
41256-15	£4.00
65C02 CMOS CPU 2MHz	£9.00
65C02 CMOS CPU 4MHz	£20.00
8257	£39.50

FLORA ELECTRONICS
14 Lever Street, Piccadilly,
Manchester M1 1LN.
Tel: 061-223 3553


PUB GAMES
NiKe
ALLIGATA BITES BACK · ALLIGATA BITES BACK · ALLIGATA BITES BACK
ALLIGATA BITES BACK · ALLIGATA BITES BACK · BITES BACK

AND THEY CALL THEMSELVES ADULTS!!!

PUB GAMES

a compilation of

BAR BILLIARDS · DOMINOES
DARTS · TABLE FOOTBALL
POKER & PONTOON
BAR SKITTLES

£9.95

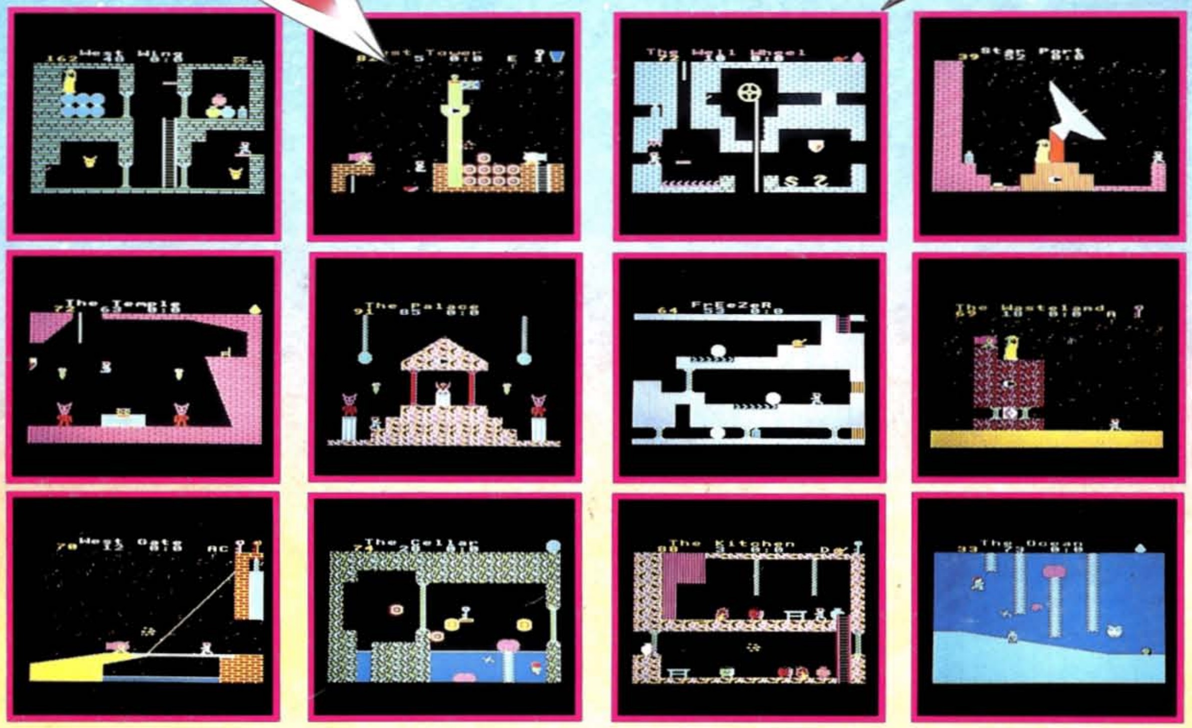
available on

Commodore 64/128 · Spectrum 48K · Amstrad
Available soon BBC · MSX

Alligata Software Ltd., 1 Orange Street,
Sheffield S1 4DW.
Tel: (0742) 755796

The times they've left you at home because 'you're not grown up' or 'not old enough to come to the pub' and look what they get up to when they get there! Here's your chance to find out what it's really like in those smoke filled haunts of adulthood. The opportunity to see how good you are at these ADULT?? games.
Why let the mums and dads have all the fun. Pub Games can be a laugh for everyone.

ACORN
ELECTRON VERSION
RELEASED 1 January 198
BBC MICRO VERSION
AVAILABLE NOW!
THE BEST ARCADE ADVENTURE EVER
Citadel


West Wing
East Tower
The Well Wheel
Star Port
The Temple
The Palace
FreEzeR
The Wasteland
West Gate
The Cellar
The Kitchen
The Ocean

ACORN ELECTRON

BBC MICRO

A huge adventure featuring over 100 beautifully detailed screens packed with challenging puzzles and awesome foes. You start in the vast 3-towered citadel with its curious cellar and well. Should you survive the perils within, you can venture on to the witch's house, Stonehenge, the pyramids, and across the desert to the mountains. Cross the ocean and you will reach the mystic temple on the island. You should devise how to use the ice crystal, trampolines, cannonballs, Egyptian statues, etc., to the best advantage in your onerous mission. Cleverly realistic animation (flickering torches, splashing water, and smouldering furnaces), is used throughout to depict your movements and to vividly portray the fearsome monks, mummies and wolves.

COMPETITION — 2 CHANCES TO WIN!

Three crowns have been craftily hidden within the adventure; the first person to locate any two of the three crowns will win **£100.**
The maximum score which can be obtained is 99 points; the first person to reach this score will be presented with an impressive personal engraved shield and a cheque for **£200.**

KEYBOARD OR JOYSTICKS **CASSETTE VERSION £9.95** **BBC DISC VERSION £11.95**

WE PAY UP TO 20% ROYALTIES FOR HIGH QUALITY PROGRAMS

SUPERIOR SOFTWARE LTD.

Dept. XU15, Regent House,
Skinner Lane, Leeds 7.
Tel: 0532 459453.

Access

VISA

OUR GUARANTEE

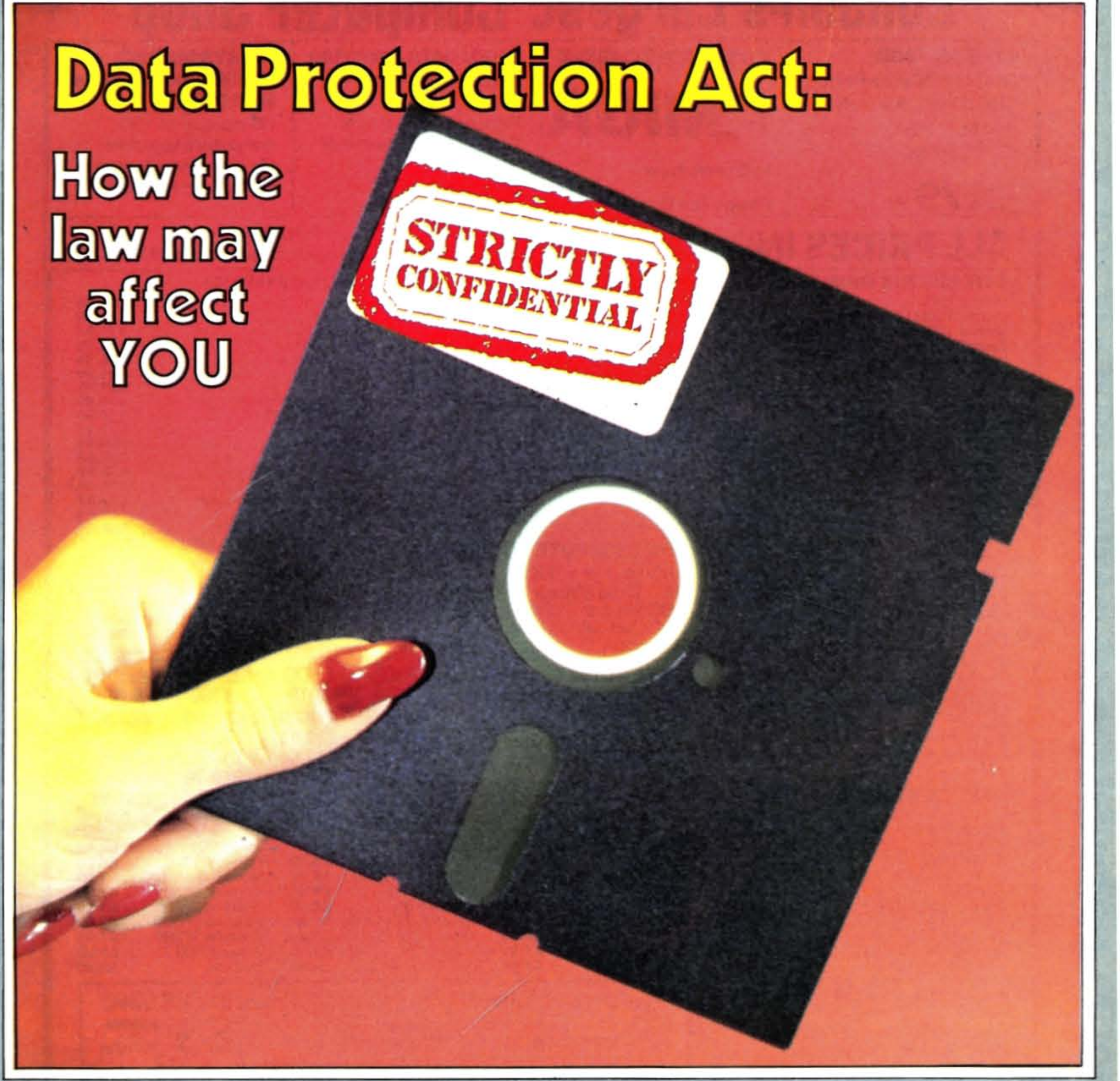
- All mail orders are despatched within 24 hours by first class post
- Postage and packing is free
- Faulty cassettes and discs will be replaced immediately

Vol. 1 No. 4 July 1986

BUSINESS MICRO USER

Data Protection Act:

How the law may affect YOU



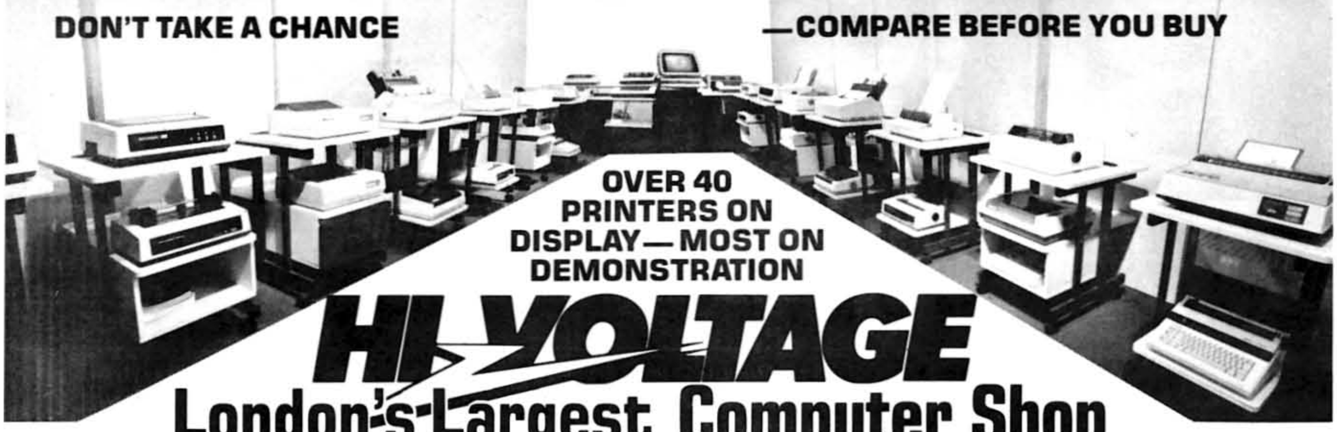
Case study: BBC Micro in marketing and promotion

Using formulae to create a sample spreadsheet

Is the BBC Micro big enough for your business?

LONDON'S LARGEST DISPLAY OF PRINTERS MONITORS COMPUTERS AND PERIPHERALS

DON'T TAKE A CHANCE —COMPARE BEFORE YOU BUY



London's Largest Computer Shop

CITIZEN 120D
NLQ Dot Matrix Printer
120 c.p.s., 4K Buffer,
Friction/Tractor, Epson/
IBM Compatible
£179.90 inc VAT

COMMODORE
AMIGA
In Stock Now
Phone for Details

QUEN DATA DWP1120
Daisywheel Printer
18 c.p.s. With FREE:
Printer Cable, Extra
Ribbon, 500 Sheets of
Paper
£199.90 inc VAT

AMSTRAD/BBC NETWORK AND 20mb HARD DISK
Connect up to 100
computers together.
On Demonstration now.
Distributor for South
London

ALL PRICES INCLUDE VAT

EXPORT
Contact our specialist export department on 01-686 6362

OPEN MONDAY-SATURDAY 9 AM-6 PM

DOT MATRIX PRINTERS

Brother HR5	£89.95
Brother TC600 Typewriter	£413.95
Brother 1509 NLQ	£482.95
Epson P40 Thermal AC/DC	£59.95
Epson LX80 NLQ	£229.95
Epson GX80 NLQ	£229.95
Epson FX85 NLQ	£425.95
Epson FX105 NLQ	£549.95
Epson LQ800 NLQ	£579.95
Epson LQ1000 NLQ	£769.95
Epson JX80 Colour	£519.95
Canon PW1080A NLQ	£309.95
Canon PW1156A NLQ	£419.95
Panasonic KP1091 NLQ	£299.95
Oki-Mate 20 Colour	£252.95
Shinwa CPA80 plus NLQ	£195.95
Micro P. 165 NLQ	P.O.A.
Seikosha GP50A	£79.95
Seikosha GP500A	£105.95
Seikosha SP1000 NLQ	£229.95
Seikosha SP1000 VC NLQ CBM	£229.95
Seikosha MP1300AI NLQ 300 cps	£459.95
Star NL10 (IBM) NLQ inc I/F	£279.95
Star SG10C NLQ (CBM I/F)	£229.95
Star SG15 NLQ	£379.95
Star SD10 NLQ	£379.95
Star SD15 NLQ	£469.95
Star SR10 NLQ	£459.95
Star SR15 NLQ	£579.95
Kaga Taxan KP810 NLQ	£279.95
Kaga Taxan KP910 NLQ	£439.95

DAISYWHEEL PRINTERS

Brother HR15 (P)	£359.95
Brother HR25	£699.95
Brother HR35	£849.95
Epson DX100	£279.95
Juki 6000	£229.95
Juki 6100	£299.95
Juki 2200 Typewriter P or S	£265.95
Commodore DPS1101	£279.95
Quen Data DWP1120	£199.95
Uchida DWX 305	£199.95

All popular interfaces, cables, etc. available from stock. Custom cables made to order.

Let our experts match your computer to the printer of your choice.

Printers — All models parallel-centronics interface Serial RS232C available at same or slightly higher prices.

MONITORS

Microvitec Colour	
1431 DS STD RES RGB	£209.95
1431 MZ STD RES Spectrum	£229.95
1451 DS MED RES RGB	£264.95
1451 DQ MED RES QL	£264.95
1451 APDS MED RES	£333.95
1441 DS High RES RGB	£449.95
Philips Monitors (Monochrome)	
BM 7502 Green	£86.95
BM 7522 Amber	£91.95
BM 7542 Paper white	£98.95
Philips Monitors (Colour)	
CM 8501 RGB STD RES	£209.95
CM 8524 Comp/STD	£259.95
CM 8533 RGB/IBM/MED	£289.95
1114 Monitor/TV	£199.95

BBC COMPUTERS — NEW

BBC Master 128K
BBC Turbo Master
BBC Master 512K
Call for Price & Delivery

BBC Dedicated Data Recorder **£16.95**

BBC SOFTWARE

View	£52.95
Graphics	£31.95
Disc Doctor	£31.95
Wordwise Plus	£53.95
Communicator	£66.95
Printmaster	£31.95
Caretaker	£31.95
Gemini Office Master	£24.95
Gemini Office Mate	£12.50
Replay	£34.95
Graph Pad II	£59.95
Logo	£68.95
Fleet Street Editor	£39.95
AMX Mouse	£78.95
Disk Box (60 disks) lockable	£13.95
Disk Box (50 disks)	£9.95
Opus Double Density DFS	£68.95

OPUS AND CUMANA DISK DRIVES

1 x 100K	£85.95
1 x 400K Switchable	£137.95
2 x 100K inc PSU	£229.95
2 x 400K Switchable	£275.95
Opus Challenger 1 x 400K + 512 Ramdisk + DD.DFS	£264.95

Opus Disk Drives now with 2 Year Guarantee

SUPERDISKS per box of ten **Add 80p for P&P per order**	SSDD 40TR	DSDD 40TR	SS96TP1 80TR	DS96TP1 80TR
BASF 5¼"	£11.50	£18.20	£20.00	£22.00
3M 5¼"	£15.50	£22.50	£22.90	£27.50
VERBATIM 5¼"	£14.00	£17.50	£17.50	£22.90
DYSAN 5¼"	£15.80	£20.70	£20.70	£27.50
TDK 5¼"	£18.30	£16.70	—	£33.90
SONY 3½"	£26.30	£37.80	MAXELL 3"	P.O.A.

PRINTER RIBBONS Single prices, deduct 10% for 5+

				Juki 2200	£4.40
Brother HR15 Corr	£3.40	CBM 1525	£5.20	Kaga KP810	£6.80
Brother HR15 MS	£6.50	CBM DPS1101 MS	£4.40	Mannesman MT80	£7.50
Brother HR5	£3.40	Daisystep 2000	£4.50	Seikosha GP50	£7.90
Brother EP44	£3.40	Epson LX 80	£4.60	Seikosha GP100	£5.20
Brother M1009	£4.50	Epson MX/RX/FX 80	£4.00	Seikosha GP500	£7.90
Canon PW1080A	£6.80	Epson 100 Series	£5.20	Seikosha GP700	£21.50
CBM 801	£7.90	Juki 6100 SS	£2.20	Shinwa CP80	£7.50
CBM 802/1526	£7.50	Juki 6100 MS	£4.40	Star/Oki	£2.20

Mail Order + Export + Trade Hot Line Phone 01-686 6362

Delivery by Securicor (4 day) please add £5.75 per item.
Delivery by Securicor 24 hour please add £9.95 per item.

Send off or order by 'phone quoting your Access, Visa No. 'Phone 01-686 6362. Immediate despatch on receipt of order or cheque clearance. Or Telex your order on: 946240 Attn 19001335. **EXPORT CUSTOMERS SUPPLIED TAX FREE.**

OPEN MONDAY-SATURDAY 9 AM-6 PM

ALSO VAST RANGE OF DISK DRIVES, JOYSTICKS, DISK BOXES, INTERFACES, SHEETFEEDERS, ETC.

HI VOLTAGE 53-59 High Street, Croydon, Surrey CR0 1QD. Tel: 01-681 3022

Prices correct at copy date. Subject to change without notice due to currency fluctuations etc. E. & O.E.

STRICTLY CONFIDENTIAL

The Data Protection Act:

Should YOUR business be registered?

JO STORK discusses how the new law could effect BBC Micro users

AFTER a busy month of talking to various groups of computer users I realised that the questions I was being asked were remarkably similar. I certainly would not have expected these three points to be of such universal concern.

- **Can you help us make sense of the Data Protection Act?**
- **What is the minimum system that is practical in a business environment?**
- **What is the best source for buying hardware and/or software?**

COLLECTORS of trivia may like to know that when the Data Protection Act (DPA) was passing through Parliament it was estimated that 80,000 computers would need to register. The intention was obviously that only those storing potentially controversial or critical personal information would need to do so.

As a result of the lemon that is now in force the number is likely to be somewhere between 500,000 and 1,000,000. What is more, with three weeks to go before the law came into force only 30,000 computers were registered.

Much of this discrepancy is because many small users decided they had better things to do with their time and £22 than register, although the natural tardiness of human nature accounts for part of the difference.

Even Electron users may need to register under this law, which came into force on May 11. The reason is that once HMG had interpreted the EEC directives, massaged the most complicated series of compromises since Salt 1 in order to bamboozle every freedom of information activist into thinking they had scored a few tactical points, wrapped the whole shooting match in legalese and ensured the exemption of State-run computers, even school teachers keeping their pupils' test marks on computer became liable for registration.

Explaining why we are stuck with this nightmare is one thing, but more important is offering guidance as to what compliance entails. Fortunately the DPA has little effect on most organisations' working practices, but the following should minimise the disruption while providing individuals their rights under this law.

- Some responsible member of the organisation must be the registered Data Protection Officer under the DPA.
- Any one who believes there is information about them held on the computer may request printed copies of such data as pertains to themselves or their next of kin.
- Any one who believes there is information about them held on the computer may demand changes to any erroneous data pertaining to themselves or their next of kin.
- Data on the micro may only be accessed by a very short list of nominated persons.
- No data may be passed to other organisations unless it fulfills the following four qualifications – firstly, that organisation is one to which the original organisation is constitutionally affiliated, for example a football club to its league or a small business to its parent company, or it is the designated auditors of the organisation.
- Secondly data passed is so "massaged" that all possibility of identifying the individuals to which the data pertains has been removed.
- Thirdly all people to which the data refers are notified that such a transfer has taken place, and finally an exact copy of the data passed is made available for examination by any person to which this data refers.
- Any one person with data recorded who can show just cause may veto transfer of data provided that veto does not place the organisation or individual holding the data outside the DPA or any other law, and that it does not hinder the organisation or individual holding the data from carrying out its stated objectives.
- All data held – whether printed or in computer readable format – is treated as highly confidential.
- Recipients of any such information must sign for its receipt and return it to the organisation when so requested, unless that data pertains to themselves or their next of kin.
- Where dispute arises between the individual's rights or wishes and the organisation's requirements, the Data Protection Officer should be the arbitrator as defined under the DPA.

Since no one anticipated that so many computers would need to register, the whole administrative machinery that was set up is unable to cope with the

►

MICROMAN Computers

ACORN SPECIALIST COMPUTER CENTRE

THE NEW BBC MASTER SERIES

Master 128	499.00
Master Turbo Upgrade	125.00
Master ET	399.00
Master 512 Upgrade	T.B.A.
Master SC Upgrade	T.B.A.

ACORN PERIPHERALS & UPGRADES

Prestel Receiver	139.00
6502 2nd Processor	199.00
Z80 2nd Procesor	399.00
IEEE Interface	325.00
Acorn 10MB Hard Disc + Level 3	1699.00
Acorn 30MB Hard Disc + Level 3	2499.00
BBC B Plus Upgrade 64-128K	39.95
ADFS Upgrade	30.00
1770 Upgrade	49.95
Acorn DNFS Disc Upgrade	99.00

RAM/ROM EXPANSION BOARDS

ATPL Sidewise ROM Board	43.70
Computer Village ROM Board	49.00
Aries B12	**46.00**
Aries B12C	**5.75**
Aries B32	**92.00**

SOLIDISK PRODUCTS

Solidisk 32K Sideways RAM	**50.00**
Solidisk 64K Sideways RAM	80.00
Solidisk 128K Sideways RAM	125.00
Solidisk DDFS 2.2 Interface	45.00
Solidisk ADFS 2.1 Interface	55.00
Solidisk 256K – now available	**175.00**

EPROM PROGRAMMERS-ERASERS-I/CS

Control Telemetry Prog. (Software extra)	**109.25**
Eprom Programmer	20.95
Eprom Programmer + ZIF Socket	25.95
Eprom Eraser	20.95
Eprom Eraser with Timer	25.95
Eproms 2764 8K Hitachi	2.75
Eproms 27128 16K Hitachi	**3.45**
27128 per 5 Eproms	**16.50**
RAM 6264LP-15 8K	3.95
27256 (12·5v)	5.95

MONITORS (including cable):

Microvitec 1431 Standard	229.00
Microvitec 1451 Medium	279.00
Philips 1114 TV/Monitor/CV	**209.00**
Philips CMB8533 Med/RGB/CV	299.00
Philips Green 7502	90.00
Philips Amber 7522	94.00

MODEMS/COMMUNICATIONS

Pace Nightingale + Commstar	132.25
Prism 2000 + Linemaster ROM	49.95
Pace AutoDial/AutoAnswer Board	56.35
Pace Auto Dial Utilities Disc	11.50

DISC DRIVES

OPUS 5802 400K 40/80T	**119.95**
OPUS 5802D Dual D/S 40/80T 800K	**275.00**
Pace PSD1 SS/40T/100K	109.25
Pace PSD1B (above in dual case)	126.50
Pace PSD3 DS/40T-80T/400K	**139.95**
Pace PSD3B (above in dual case)	161.00
Pace PDD3 DS/40T-80T/800K	276.00
Cumana CSX100 SS/40T/100K	114.95
Cumana CSX400 DS/40T-80T/400K	154.95
Cumana CDX800 DS/40T-80T/800K	299.95
Pace PSD1P SS/40T/100K	143.75
Pace PSD3P DS/40T-80T/400K	169.05
Pace PSD3PB (above in dual case)	186.30
Pace PDD3P DS/40T-80T/800K	312.29
Cumana CS100 SS/40T/100K	147.95
Cumana CS400 DS/40T-80T/400K	179.95
Cumana CD800S DS/40T-80T/800K	339.95
Pace Power Supply	44.85
OPUS Challenger 256K	**199.00**
Opus Challenger 512K	**229.00**

All our prices include VAT.

Mr. Floppy or Wabash 5.25" DS/DD/80T (10)	**16.50**

AMX MOUSE

AMX Mouse (Master version available)	**89.95**
AMX Desk	24.95
AMX Utilities	14.95
AMX Paintpot	14.95
AMX Super Art ROM	49.95
AMX Pagemaker (Master version available)	**49.95**
AMX 3D Zicon	24.95
AMX Database	24.95
AMX Xam	24.95

KAGA PRINTERS

Canon PW1080A + BBC Cable	289.00
MP165 + BBC cable	**POA**
Canon PW-1156A	459.00
Canon PJ1080A Colour	**POA**
Quandata Daiseywheel	**149.00**
Juki 6100 Daiseywheel	379.00
Epson LX80 NLQ	258.75
Star NLQ	**POA**

JOYSTICKS

Voltmace 14b Handset	14.95
Voltmace 3b Singlet	12.95
Voltmace 3b Dualset	19.95
Voltmace 14b Interface	14.95
Voltmace Driver Cassette	5.95
Voltmace Datapad Keyboard	39.95

WORD-PROCESSORS

Interword	**POA**
View 2.1 ROM	52.00
View 3.0 ROM	79.00
View Printer Driver Generator	11.50
View Index	14.95
Wordwise ROM	44.85
Wordwise Plus ROM	49.00
Spellcheck III ROM (View & WW)	35.99
Merlin Scribe ROM	59.95
Edword 2 ROM	52.84

DATABASES

Viewstore ROM	52.00
Acorn Database (Disc)	15.35
Gemini Datagem ROM	79.95
Merlin Database ROM	49.00
Masterfile II (Disc)	22.00
Betabase	25.00
Betabase Utilities	12.00

SPREADSHEETS/CHARTS

Viewsheet ROM	52.00
Ultracalc ROM	79.50
Interchart ROM	33.95
Intersheet	**49.95**

LANGUAGES

BCPL ROM	59.80
BCPL Calculations (Disc)	34.50
BCPL Stand Alone Gen. (Disc)	49.90
ISO Pascal ROM	59.95
ISO Pascal Stand Alone Gen.	34.50
Comal ROM	49.85
Acorn LOGO ROM	69.00
Open LOGO ROM	69.95
Logotron LOGO ROM	69.00
Micro-Prolong ROM	79.95
Microtext (Disc)	59.80
Acorn Forth ROM	49.85
6502 Development System (Disc)	49.85

UTILITIES

Acorn Basic Editor	29.90
Acorn Termulator ROM	34.50
Acorn Graphics Ext. ROM	29.90
Disc Doctor ROM	33.35
Printmaster ROM	33.35
Termi II ROM	33.35
Accelerator ROM	64.40
Graphics ROM	33.35
System ADE ROM	60.00
System SPY ROM	30.00
Romit ROM	34.00
Iconmaster ROM	34.01
Sleuth ROM	32.00
Toolkit Plus ROM	39.00
Exmon II ROM	32.00
Help II ROM	31.00
Discmaster (Disc)	21.00
Dumpmaster II ROM	31.00
Slave Plus ROM	39.95
Floppywise Plus ROM	29.95
Vine Replay ROM	35.00
Hershey Font (Disc)	21.00
Fontwise (Disc)	12.00
Fontaid ROM	30.00
Fontaid Utilities (Disc)	15.00
Computer Concepts Speech System	**POA**
Beebug Studio 8 (Disc)	22.00
Island Music System (Disc)	29.95

ELECTRON PERIPHERALS

Electron View	29.95
Electron Viewsheet	29.95
Electron Logo	59.80
Electron ISO Pascal	59.80
Cumana Disc Interface	74.95
Pace Modem + Commstar	159.85

CAD SYSTEMS & PLOTTERS

Microman have opened a new CAD centre offering full demonstration facilities for the ROBOCOM BITSTICK I & II SYSTEM for the BBC Computer and ROBOCAD & PCB DESIGNER for the FERRANTI PC Computer. We stock a comprehensive range of plotters, including WATANABE, HITACHI, EPSON, PLOTMATE, PENMAN and are main dealers for the ROLAND range of plotters.

Bitstik 1 (Master version available)	**375.00**
Bitstik Multi-plotter Driver	79.00
Bitstik 2	914.25
Bitstik 2 Upgrade	517.50
Roland DXY-880 A3 Plotter	943.00
Roland DXY-980 A3 Plotter	1380.00
Roland DPX-2000 A2 Plotter	4370.00
Watanabe A3 Plotter (6 pen)	1148.85
Epson HI80 Plotter (4 pen)	458.85
Hitachi A3 Plotter (4 pen)	569.25
Linear Graphics Plotmate	343.85
Penman Plotter	228.85
Penman Micad Special Pack	249.00
Penman Utilities Special Pack	249.00
Trackerball RB2 + ICON software	**69.95**
NOVOCAD (Trackerball compatible)	113.85
NOVOCAD Plotter Utility Program	**32.78**
Pineapple Diagram Software	25.00
Graph Pad II	59.50

MICROMAN PLOTTER ROM

Allows plots from most graphics packages. Phone for Spec Sheet 29.95

Dealer Enquiries Welcome

AMSTRAD BUSINESS CENTRE

Amstrad PCW8256	458.85
Amstrad PCW8512	573.85

Business, Languages, Utilities, Networking for Amstrad, BBC, IBM, Apricot.

Phone or call for full details.

SATELLITE TV SYSTEMS NOW AVAILABLE

MAIL ORDER SALES

PHONE
074488 5295

Access

VISA

We accept both Access & Visa credit cards. Simply telephone your order, giving card number, address and expiry date, or send your order with cheque or postal order to our above address.

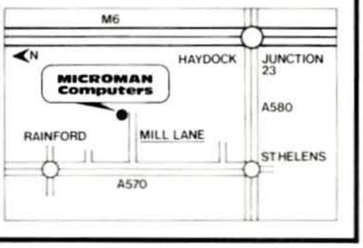
Carriage/Postage Charges: Computers/Printers/Disc Drives: Next day delivery, £8.00; ROMS/Exp. Boards/Software: First class post, £1.00; Books: First class post, £1.50.

All our prices include VAT.

SHOP

Open 9-6 Monday to Saturday. All our prices include VAT. Educational, Industrial & Government orders accepted. Export enquiries welcome.

Rainford Industrial Estate,
Mill Lane, Rainford,
St. Helens, Merseyside.
Phone 074488 5242



From Page 3

numbers that have come within the law. Consequently many micro users are ignoring the DPA on the basis that they are highly unlikely to be caught.

No doubt a few highly publicised test cases will be brought to try and dissuade users from continuing to do so. My recommendation however is that since the points listed earlier are hardly onerous, holders of personal information on a BBC Micro should register.

What system?

IT is virtually impossible to give hard and fast rules as to what is the minimum system that is practical in a business environment. However there are five points to consider and once we have dealt with these the minimum system will have chosen itself. I shall discuss them in order of precedence.

Firstly, what is the smallest operating system that can handle the task? Micro manufacturers are faced with a legion of compromises before they have a marketable product – if they provide too few facilities the more expert users will complain and if they provide too many then the more inexperienced may find the system difficult to use.

An attempt to overcome this problem has been the creation of icon-based systems such as Gem or Windows. Unfortunately the reasons why a minimal system can not employ such facilities are that they need a considerable amount of memory and they take a fair percentage of the CPU's resources.

Cycle-stealing, as it has become known, is now a major problem with many mainframe computers. As processor power climbed and memory prices tumbled more of the available resources were used in servicing the system overheads and less in doing the useful work the computer was originally bought for.

As software features of only marginal worth were added the productivity actually dropped. Sadly there have been many cases where larger computers were got to replace early models but both supplier and user soon discovered that the older, albeit over-loaded, equipment was actually doing the more useful work.

This situation has not yet arisen with micros, but the first danger signals are evident. Micro software which needs a minimum of 384k to run is now commonplace, though mercifully Acorn is still free from these.

You are by now familiar with my persistent urging to refrain from getting more application software than you need. Do not forget that this principle equally applies to operating systems.

Secondly how much space is needed for the on-line Help facilities? Users are notoriously bad at using operation notes. While part of the reason is that these are frequently so badly written, it is also true that there is something about human nature which stops a person sitting at a keyboard from going to a book or vice versa.

The result is that we must accept that any system worth its salt requires lengthy sections consisting of Print statements offering the operators guidance for every option they may be faced with.

Since these statements need to be called at the time when the option has to be made, approximately 25 per cent of a program's size in the systems which I design is usually taken up with such instructions. If the disc handling is suitable – see below – then randomly accessing a Help file is a way of saving RAM.

Obviously the precise percentage of RAM given to operator assistance will vary depending on whether you are writing a spreadsheet or an invoicing system – the former needs much less.

By now you should be getting some idea as to the memory requirements of a minimal system. However this can change drastically after the third factor is considered. Let's examine what the minimum file handling requirements are. Different applications have different file requirements. As a general guide this table shows the minimum values likely to prove satisfactory in all but the smallest of systems:

File	Record Size	Number of Records
Stock file	75 characters	2,000 records
Customer file	100 characters	400 records
Sales file	70 characters +25/item line	1,500 records
Supplier file	100 characters +25/item line	250 records
Nominal file	50 characters	500 records
Personnel file	600 characters	30 records*
Payroll file	90 characters +40/week held on-line	60 records*
(Help file	80 characters	100 records)

Minimum file handling requirements

These dry figures do not tell the whole story. For a start the number of records for personnel and payroll represent the minimum number, since if less staff are involved it is not really practical to computerise these tasks. Also most applications should open more than one file simultaneously. For example, stock recording requires the Stock file and Supplier file for goods inward while needing the Stock file and Customer file for goods outward.

If you produce a table such as this it should not come as a surprise to discover that the system will require three randomly accessed files occupying over 200 Mbyte of disc storage on line at any one time, excluding the program itself.

Our fourth consideration is how long it takes to enter the data for one transaction and the time required for its processing. If the micro is used for less than 10 hours per week this is a less critical calculation than if someone is going to spend the greater part of their working day at the keyboard. Nevertheless it is still vital to establish some ratio between data entry time and processing time.

Arguably the most important mistake in configuring a system is to have the processing done in double-quick time when the data entry is very slow. Stuffing whole

→

From Page 5

files into memory is a sure-fire way of getting this ratio wrong.

There is considerable pressure to purchase as much raw computing power as you can afford. In fact, except for the sorting of files and spreadsheets, most commercial tasks do not need particularly powerful processors. Business applications are almost invariably Input/Output-bound – that is, restricted by the keyboard, printer or discs.

This is just as well because after a few days of living with a system which can process at very high speed the average operator will begin to feel that he has lost control of it and is being driven by the silicon.

The next most frequent mistake is the exact reverse, in other words having such a snail paced processor that the operator becomes frustrated at the lengthy waits that are necessary between inputs.

If the bulk of the work is going to involve frequent sorting, spreadsheets or considerable mathematical activity you may need all the power you can get for the money. If you can afford a Winchester disc and/or cache memory, you can get away with far less processor power.

Nevertheless with memory so cheap and co-processors hardly expensive, Winchesters are not cost-effective if you don't require the file handling capacities and facilities they provide. Having ample memory is still the cheapest way of providing processing speed, provided the memory can be rapidly filled with the data to be manipulated.

On the other hand if the task is a typical 40 characters of input followed by a file access and a simple Debit-Credit-Plonk then a relatively slow processor and much reduced memory will be little or no handicap.

Finally, is the keyboard suitable for the application? Time and again users forget this question, because it is very much a matter of personal preference. Some operators prefer keyboards which are quite sharply angled whereas others want them virtually flat, and some prefer keys to be relatively stiff while others want them extremely light to the touch.

Although this may not be of such importance to the non-typist it is a major concern to those who carry out several hours of word processing at a stretch.

As a general rule I reckon there are four minimum requirements assuming you are prepared to live with some inefficiencies in display format or graphics handling. First you need 16k memory – including Helps – available for the program. Few require more than this, since splitting and chaining into smaller modules is often more efficient.

You also need a random access filing system capable of handling a maximum record length of 1k characters, 5,000 records per file and three files simultaneously, a processor capable of recalculating a 500 cell spreadsheet of average complexity in less than 10 seconds and finally a keyboard which suits the operator's typing abilities and style.

This brings us to the obvious supplementary question – can a BBC Micro be regarded as a practical proposition? The sad fact is that despite the claims of many software houses who are peddling their wares, the smaller models are not ideal buys unless you are prepared to add a certain amount of chippery to them. If you want a micro for a small business there are many better machines available.

Yet while the processor power/memory/disc handling/memory/keyboard mix of the BBC Micro is far from ideal for business it is certainly capable of doing a useful job of work. I have few such reservations regarding the newer and larger models, although Acorn's pricing policy may make them unattractive to new buyers.

Where to buy?

IN the nearest major shopping centre to where I live three of the four major chains supplying micros are worse than useless as far as commercial systems are concerned. The reason is nothing to do with the range of hardware offered, the software available or the prices they charge.

It is simply because they employ youngsters with little or no computer experience. Indeed the primary qualifications for employment behind their counters would appear to be ownership of a trendy suit and a score of over 5,000 at Pacman.

However if I travel 30 miles in the opposite direction the chains would be the ideal place to buy a system, as the staff are more mature and have a genuine understanding of a commercial user's needs.

The problem is that novices to computing find it difficult to judge between good, bad and indifferent retailers. For their benefit I offer the following two questions which may be used as an acid test of a dealer's competence – Can you show me? and How many have you personally supported?

I am never concerned if the actual fingerwork during a demonstration is less than slick, since I rarely have difficulty in telling the difference between an operator who is somewhat unpracticed and a piece of software which is awkward to use.

Similarly it only takes a couple of supplementary questions about an organisation's conversion to a computerised system and the manager will know whether the vendor is waffling or offering genuine support.

If you are not completely satisfied with the answers to these two questions, you should hunt for another supplier.

This leaves a final potential supply of equipment or software and the mail order suppliers offer some exceptional bargains and while potentially a much riskier source, there is no denying that much merchandise which never comes within a country mile of most High Streets, is available by post.

For the younger user who is fully clued up about computing, scouring the advertisements of this magazine can be a highly rewarding activity. It is the older, less confident businessman who must apply considerable care before sending off an order. This is when having an objective friend or advisor becomes really invaluable.

MICRO MEDIA Computer Supplies

0707 52698 or 0707 50913

Rydal Mount, Baker Street,
Potters Bar, Herts EN6 2BP

UNBRANDED 5¼" DISCS

Certified lifetime warranty hub rings, envelopes, labels

Prices per 10 Discs	Tracks	10+	30+
SS/DD	40	7.50	6.80
DS/DD	40	9.00	8.20
DS/DD	80	9.50	8.70
3M 5¼"		Lifetime	Guarantee
SS/DD	40	11.90	11.60
DS/DD	40	14.00	13.70
SS/DD	80	17.50	17.00
DS/DD	80	18.70	18.00
3M 3½"	TPI		
SS/DD	135	21.90	21.00
DS/DD	135	30.20	29.40
VERBATIM DATALIFE			
SS/DD	40	12.80	12.40
DS/DD	40	15.80	15.40
SS/DD	80	15.80	15.40
DS/DD	80	20.50	20.10

COMPUTER LABELS

Continuous fanfold sprocket fed	Price per 1000 1,000	2,000+
70 x 36	4.40	4.00
89 x 36	4.50	4.10
89 x 49	6.20	5.70
102 x 36	4.70	4.40

Please state no of labels across sheets (1 2 or 3)

9½" BACKING SHEET FOR FIXED TRACTOR

	2,000
70 x 36 3 across	4.00
89 x 36 2 across	6.60
102 x 36 2 across	6.70

ENVELOPES

	Boxed	Price per box
110 x 220 4¼x8⅝ White Self seal 90gsm	500	11.90
Manilla Banker Gummed 70gsm	500	9.90
Bond 324x229 12¾"x9" Manilla self seal 90gsm	250	17.90

COMPUTER PAPER

Plain, fanfold, micro perf edges

Size	Weight gsm	1000s per Bx	Price per box 1 box	2 Bxs+
11 x 9½	60	2	13.00	12.20
	80	2	16.20	14.60
EXACT A4	70	2	21.50	18.90
11⅔ x 9¼	90	1	13.70	11.50
EXACT A4 Fixed Tractor Feed				
11⅔ x 9½	80	1	16.75	14.20
	100	1	29.00	27.50

PRINTER LEAD

Centronics lead to connect BBC to EPSON KAGA CANON etc

1 mtr – 6.50
2 mtr – 8.50

SWIVEL BASES

FOR MONITORS

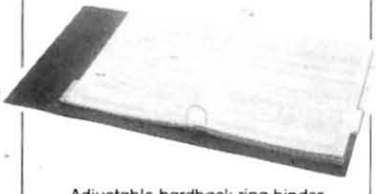
Pan tilt revolves around 360°
12.5° tiltable up and down
Adjustable by inside screw.

12" MONITORS	£14.00
14" MONITORS	£16.00

COPY HOLDERS

Adjustable arm desk clamping
£18.00
Desk top with detachable line guide
£11.00

PRINTOUT BINDERS



Adjustable hardback ring binder
for 11 x 9½ 12 x 9¼ con't paper
40mm paper capacity
BLUE RED or BLACK
£4.90 each
set/5 indexes £2.30

PRINTER RIBBONS

Mixed types for quantity breaks, 1 & 2 off's if ordered with other products

	3+	6+
ACORN AP 80	2.95	2.40
AP100	2.95	2.40
INK JET CART.	6.00 per 6	
BROTHER HR 5	3.00	2.80
M1009	3.70	3.20
HR15 MS	3.50	3.00
HR15 Fabric	3.60	3.10
CANON PW1156/1080	3.40	2.90
Red Brown Blue	5.30	4.70
CENTRONICS G.L.P.	3.70	3.20
DAISYSTEP 2000 M/S	3.10	2.60
Fabric	4.90	4.20
EPSON FX/MX/RX 80	3.00	2.60
Red Blue Brown	4.20	3.50
LX 80	3.00	2.60
Red Brown Blue	4.20	3.50
JUKI 6100 MS	2.50	2.10
6100 SS	1.60	1.30
Red Brown Blue	2.50	2.10
2200 Fabric	3.70	3.40
2200 SS	3.10	2.75
2200 corr	4.00	3.60
KAGA KP810/910	3.40	2.90
Red Brown Blue	5.30	4.70
M/TALLY MT 80 M/S	4.00	3.20
NEC PC 8023	3.60	3.00
OKI 80/82	1.60	1.30
Red Brown Blue	2.40	2.00
PANASONIC KPX 110	7.50	6.30
QUENDATA 2000 MS	3.10	2.60
Fabric	4.90	4.20
SEIKOSHA GP 80	2.95	2.40
GP 100/250	2.95	2.40
GP 500	3.90	3.30
SHINWA CP 80 M/S	4.00	3.20
SMITH CORONA		
EL 1000/2000 M/S	8.50	7.90
Fabric	3.90	3.60
Correctable	5.00	4.70
STAR GEMINI 10x 15x	1.60	1.30
Red Brown Blue	2.40	2.00
NL 10	5.60	4.90
WALTERS VM 80 M/S	4.00	3.20

If the ribbon you require is not listed ring 0707 52698 and let us quote

DISC MAILERS

	Price each 50+	100+
Rigid Cardboard holds up to 3 discs	40p	28p

MM 100N
5¼ x 100

MM 70L
5¼ x 70

MM50L
5¼ x 50

MM40L
3½ x 40

Rexel Mini Disc Box 30.

5¼ x 30
Brown smoked
Tilt lid. Cream plastic base

Plastic Library Case
5¼ x 10

DISC BOXES

MM 100	5¼ x 100	11.90
MM 70	5¼ x 70	10.90
MM 50	5¼ x 50	8.90
MM 40	3½ x 40	8.90
Mini Box Rexel	5¼ x 30	5.00
Library Case	5¼ x 10	1.50

All MM boxes anti-static with lock.

DISC CARE

5¼" Head Cleaning Disk with 15ml cleaning solution 5.50

- Educational and HMG orders accepted.
- Trade enquiries.
- Personal callers welcome.

ALL PRICES INCLUSIVE OF POSTAGE & PACKING
Please add VAT at 15%

24-Hour Credit Card Orders **0707 52698**

-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-MICRO MEDIA-

Database proudly presents..

When it was launched in October, 1984, Mini Office was acclaimed as the most innovative software of the decade, creating new standards in serious programming – and at a price everyone could afford.

Since then it has become far and away one of the best-selling packages ever created for the BBC Micro, frequently displacing games from their position in the Top Ten. And, unlike most software releases, it is still as much in demand now as it was 15 months ago.

Which is why there has been so much speculation throughout the industry about what the much-rumoured Mini Office II would be like. After all, how do you beat a best-seller?

The answer is – by making it even better! And the new Mini Office II is certainly that ... in every respect.

While still retaining upward compatibility with the original Mini Office, it is packed with a host of new features that have been made possible by the tremendous strides made in programming techniques in the last 12 months.

The result is the most comprehensive suite of business programs ever produced for the BBC Micro – and still the best value ever.

And it comes with a no-nonsense easy-to-follow guide to business computing that will take you step by step through all the many features, showing you how to use their huge potential to the full.

Some of the features of the new Mini Office II

With the word processor you can ...

★ Select most features by menu or embedded commands ★ Transfer records from database for personalised circulars ★ Choose from three methods of display: 20 column (double size characters), 40 column, 80 column (20 and 80 columns only on 'B' Plus and 6502 Second Processor). ★ Centre, indent, tab, justify and merge text ★ Insert, copy, move or delete blocks of text. ★ Select two editing modes: insert or overwrite ★ Search and replace globally or selectively ☆ Check typing speed in words per minute ☆ See on-screen real-time clock, plus word and character count.

With the database you can ...

★ Select five field types (Alpha, Decimal, Date, Integer, Formula). ★ Perform all arithmetic functions. ★ Search over multiple fields. ★ Mark individual records ★ Use flexible printout routine ★ Pass records to the word processor ☆ Carry out powerful multi-field record sorting.

With the spreadsheet you can ..

★ Total rows and columns, with easy selection of criteria ★ Copy formulae either absolutely or relatively ★ Print out all or part of the spreadsheet. ★ Move directly to a specific location. ★ Select movement of cursor ☆ Recalculate automatically or manually.

With the label printer you can ...

★ Design any style of label with the versatile editor ★ Select label size and sheet format ★ Read directly from database files.

With the graphics pack you can ...

★ Enter data directly or take from spreadsheet ★ Use icon type menus ☆ Choose pie chart, bar chart or line graph ★ Display up to three line graphs simultaneously ★ Display up to three bar charts side by side or stacked. ★ Choose bar charts in either 2D or 3D ★ Draw compacted or emphasised pie charts ★ Define your own style of shading ★ Dump graphs directly to Epson or Seikosha compatible printer.

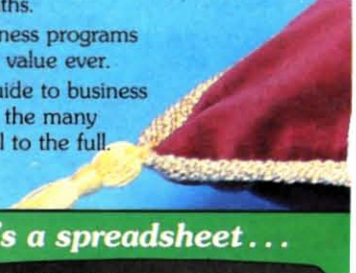
With the comms pack you can ...

★ Access MicroLink or Telecom Gold with only two key presses ★ Select protocols as required ★ Change modes while on-line ★ Store text directly to memory or disc ★ Use one-key 'Stop' command.

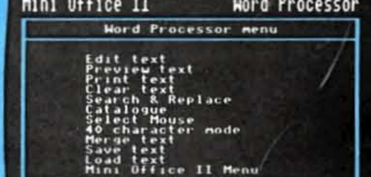
With all the modules you can ...

★ Use the AMX Mouse ★ Choose foreground and background colour in most modes ★ Make more efficient use of memory and faster response time thanks to machine code content. ★ Take advantage of the extra memory of the BBC B Plus and 6502 Second Processor.

★ **Features that were not in the original Mini Office.**

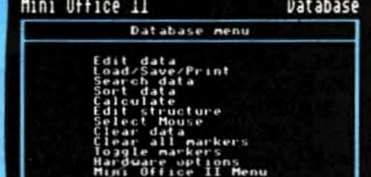


It's a word processor ...



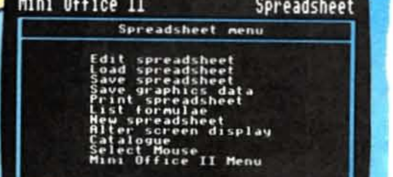
```
Mini Office II                Word Processor
            Word Processor menu

          Edit text
          Preview text
          Print text
          Clear text
          Search & Replace
          Catalogue
          Select Mouse
          40 character mode
          Merge text
          Save text
          Load text
          Mini Office II Menu

         Use cursor keys to choose
           then press RETURN
        (c) Database Software 1986
```

It's a database ...



```
Mini Office II                      Database
               Database menu

            Edit data
            Load/Save/Print
            Search data
            Sort data
            Calculate
            Edit structure
            Select Mouse
            Clear data
            Clear all markers
            Toggle markers
            Hardware options
            Mini Office II Menu

         Use cursor keys to choose
           then press RETURN
        (c) Database Software 1986
```

It's a spreadsheet ...



```
Mini Office II                   Spreadsheet
              Spreadsheet menu

           Edit spreadsheet
           Load spreadsheet
           Save spreadsheet
           Save graphics data
           Print spreadsheet
           List formulae
           New spreadsheet
           Alter screen display
           Catalogue
           Select Mouse
           Mini Office II Menu

         Use cursor keys to choose
           then press RETURN
        (c) Database Software 1986
```

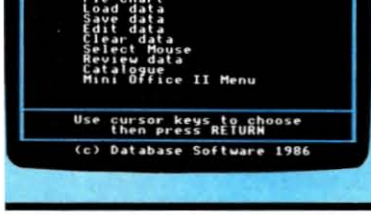
It's MINI OFFICE II on the BBC Micro! All 6 modules

Software

ORDER FORM ON PAGE 143

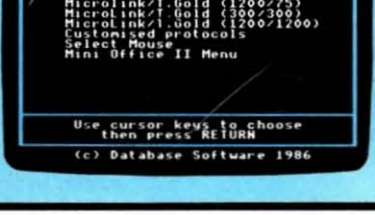
```
Mini Office II
Main menu

Word Processor
Database
Spreadsheet
Graphics
Communications
Label Printer
Exit Mini Office II

Use cursor keys to choose
then press RETURN
(c) Database Software 1986
```

It's a graphics pack . . .



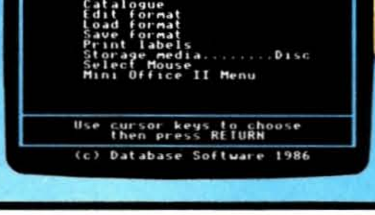
```
Mini Office II                Graphics
Graphics menu

Bar chart
Line graph
Pie chart
Load data
Save data
Edit data
Clear data
Select Mouse
Review data
Catalogue
Mini Office II Menu

Use cursor keys to choose
then press RETURN
(c) Database Software 1986
```

It's a comms pack . . .



```
Mini Office II          Communications
Communications menu

Microlink/T.Gold (1200/75)
MicroLink/T.Gold (300/300)
MicroLink/T.Gold (1200/1200)
Customised protocols
Select Mouse
Mini Office II Menu

Use cursor keys to choose
then press RETURN
(c) Database Software 1986
```

It's a label printer . . .



```
Mini Office II           Label Printer
Label Printer menu

Load file
Append file
Catalogue
Edit format
Load format
Save format
Print labels
Storage media........Disc
Select Mouse
Mini Office II Menu

Use cursor keys to choose
then press RETURN
(c) Database Software 1986
```

for £14.95 (cassette), £16.95 (5¼" disc), £19.95 (3" disc)

The making of a one man business

WHEN I started Firebourne I did hardly anything with the computer the way you are supposed to. Software wasn't carefully evaluated and matched to my needs – to be frank I hardly knew what my needs were, let alone what they would be.

Peripherals were bought piecemeal and plugged into the micro I already used as an "adult toy". Yet somehow it has all come together, providing everything I need now and for the foreseeable future. Obviously, somewhere along the way I did something right. With hindsight, and in the light of the activities of the business, perhaps that was the choice of a BBC B as my electronic toy.

Firebourne has to do the same things as most businesses – generate invoices, keep the books, placate the VAT officer and send letters. Its particular business is marketing and promotion consultancy, so most of the output is reports, plans and text for promotional material.

The differences from most small businesses are that the number of transactions is relatively small, and there is no stock to keep under control. These are two major factors in keeping administration straightforward, and are perhaps the reason why I've been able to break the rules and get away with it. For all that, the system I have could cope with a business much more elaborate than mine.

Taking the hardware first, the BBC B is standard except for the addition of a Watford Electronics ROM board. An ordinary Acorn DFS controls Cumana dual double-sided 40/80 track disc drives. The monitor – essential for any business application – is a green screen Samwoo. Finally, the printer is a Juki 6100 daisywheel. It's all in daily – and often nightly – use, and has performed consistently well.

The BBC's strengths, apart from its performance, are its versatility and wide base of users. That shows in the range of peripherals available and the ease with which they can be used. The drives, monitor and printer were all just plug-in-and-go purchases. I bought 40/80 track drives "just in case" and the forethought has paid off in that I occasionally have to read 40 track discs without the option. Apart from that I work exclusively in 80 track format.

The dual drives are a bit of a luxury. However, they do have an unquantifiable benefit which I would describe as the absence of irritation thanks to not having to swap discs repeatedly. To know it is to loathe it!

The monitor was chosen quite carefully in that I actually saw several models demonstrated displaying Mode 0 text, not just 80 column, but BBC 80 column. I was not impressed by the ones I saw until I realised the dealer was not aware of the interlace control given by the BBC's operating system. Once I'd switched off the interlace with the *TV command most of the displays sprang into sharpness and I was able to make my choice.

The printer was one of the easier decisions. I knew that dot matrix printers were fast and that NLQ was at that time becoming available on machines I could afford. However there were two reasons why dot matrix was not suitable for my needs. Firstly, Firebourne operates in areas where presentation is considered very important. Secondly, it is sometimes to my advantage to be able to output camera-ready typescript for printing.

Where standards are anything above the typographically awful, even good NLQ still has that "N" woefully evident to eyes as critical as my clients.

So it had to be daisywheel, and the Juki performs admirably. It enables me to produce crisp-looking letters, plans that inspire confidence because they really look good, and copy that keeps me friends with my typesetter because he can read it without going dotty.

The presentation aspect is important because it conveys quality and reliability and offices filled with back-up staff. There's no need for any client to as much as suspect that (just between you and me) I actually work from an "office" at home. With no other staff.

Of course hardware alone is not enough – you need software too. That's where the wide user base of the BBC scores again, with loads of cheap (in a business context) effective packages on the market. My main requirement is for word processing, and I was lucky enough to be able to try out a friend's Wordwise (Computer Concepts) for a few days. I was impressed by how easy it was to use, and using visible embedded codes between markers seemed to come naturally to me.

Although I could see the attraction of the so-called "what you see is what you get" type of word processor, on balance I liked the easy to read Mode 7 edit screen and the completely clean preview screen. When Wordwise Plus became available I snapped it up.

To save time I use a variety of standard forms – analogous to the stationery pad on machines like the Macintosh – for documents like invoices, statements, reports, schedules and sales letters. The details are quickly entered from the keyboard or from disc files.

The real benefit, though, is WTCTCPLYGWWP (Whatever They Call That Clever Programming Language You Get With Wordwise Plus). I load

Like many small businessmen, Ken Knowles works from home on his own. Not for him the luxury of a secretary or a filing clerk to do his bidding. In their place he has his BBC Micro to ensure that Firebourne – his marketing and promotion company based in Reading – runs smoothly.

Here he outlines how he came to grips with his machine and ensured it became the only real back-up he needs in his day-to-day operations.

several short routines into the segments using a !BOOT file – for example a stationery/standard forms menu that lets me select and load my choice from disc quickly and easily with a total of just two key presses.

Supporting the word processing function I have Romspell (Watford Electronics) installed. I can spell, but I don't type very accurately. Once I'd realised that was going to lead to too much proof reading and reprinting, a spelling checker became essential. Now I run all output through it as a matter of routine.

When clients need it I can supply text for catalogues, for example, on disc so that it can be phototypeset directly. There's no need for the text to be re-keyed, and no need for proof reading – valuable time and money savers.

On the financial side I use a spreadsheet – Ultracalc 2 from BBC Soft – which is quite sufficient to allow me to make useful cash flow forecasts, for example, and keep my books to the satisfaction of the VAT officer. I stress that it's no more than the books I'm keeping, with a few key reporting facilities; it's not an accounting system.

I considered using an accounting package but couldn't find one good enough and cheap enough to suit my way of business. For example, to help get my fees promptly out of big companies, I try to make sure that invoices go to the right person in the right department. The problem is that this tends to generate long addresses, and getting round accounting packages that use fixed or insufficiently flexible formats for things like addresses is more trouble for me than the package is worth.

As an experiment I did buy a very cheap commercial package just to get the feel of working with one. I am still recovering from the shock of seeing my very first input, 45th qwerty 1066, being accepted as a valid date. Error response within the program seemed to be confined to ON ERROR RUN, which at least gave me plenty of chances to get the date right. It did not inspire confidence and would not have endeared me to the VAT

How does the BBC Micro compare with other systems? Dedicated word processors like the CPT range can be wonderful, there's no doubt. The Macintosh is great fun to use – no small recommendation for a business tool. But they can all be cripplingly expensive for small companies, and even if affordable their cost-effectiveness is low compared with the BBC Micro.

People like you and me, business people rather than operators, who use these and machines like the IBM clones are often impressed by the speed of the BBC Micro. Not the CPU clock rate, but the fact that mostly all you need to do is switch on and go with software that's amply powerful and easy to use.

You'll notice that all the BBC Micro's software I've mentioned is ROM based. Until you've experienced the irritation of loading a DOS, then loading the word processor or other application, discs whizzing about like mad, you can't fully appreciate the convenience of sideways ROM.

So the BBC Micro works for my business by being a versatile piece of hardware that connects easily to any peripheral I envisage using. The machine runs a wide range of cheap general purpose software which is easy to adapt to my specific requirements without the need to run back and forth to the dealer for help.

That Firebourne exists at all is made possible by my BBC Micro's system. No book-keeper. No office typist. In fact, no office.

Quite simply, if I had needed to employ and house another person to do this work with a conventional typewriter, Firebourne would not have survived its early days, and could only be operating now with dramatically reduced profit. And that, after all, is what business is about.

NEW BBC PRODUCTS FROM CLARES

FONTWISE PLUS £20.00

Due to the phenomenal success of FONTWISE we just had to make FONTWISE PLUS compatible with VIEW as well as WORDWISE and WORDWISE+, at your insistence!

Now you can have PROPORTIONAL and JUSTIFIED text in 12 different fonts, all within the same document if required. In addition to the standard facilities like line and page length, pagination, left margin etc. we have now added

- Enlarged, standard & condensed fonts
- Tabs
- Temporary indent
- User definable line feed
- User definable character spacing
- Non proportional fonts
- Now with 12 fonts
- Plus many more features

If you are not convinced ask us to send you a sample printout and you will be amazed at the quality - requires an EPSON compatible printer capable of single, double and quad density graphics but you do not require any RAM in your printer to use FONTWISE PLUS.

BETA-ACCOUNTS £25
STATEMENT AND ACCOUNTS RECEIVABLE MODULE

This module uses the transaction files created by the INVOICE module to prepare statements at regular intervals. The statement run is totally automated once security backups have been completed and will save hours of work every month. The Accounts Receivable allows you to enter all outstanding debts for an account and it is then automatically kept up to date by the invoice program. All payments received are entered into the accounts receivable file and allocated against the outstanding account.

In addition to the time saving operations performed by this module you can also obtain valuable management information such as debtor lists, which can be printed together with telephone numbers. It is also possible to query any particular account and obtain an up to date picture of the position.

STOCK CONTROL MODULE £25

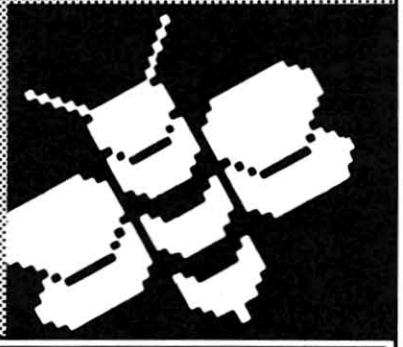
The stock control module is used in conjunction with the invoice program and is updated whenever an invoice is issued. It is then possible to automatically search the stock file for out of stock or re-order level items. Purchase orders can then be printed, automatically if required.

As with the Accounts Receivable there are many forms of management information available including stock numbers and values both numerically and as a percentage figure. This enables you to identify slow or fast moving parts easily.

A parts explosion option is also available for just £10 extra.

A twin double sided drive is required for the STOCK CONTROL module.

Ask for a full data sheet



MACROM £40 £35 DISC

MACROM is a fast full featured MACRO ASSEMBLER ROM that allows the use of macros, which are loaded from a macro library stored on disc. Assembly can be from disc to memory, disc to disc, memory to memory or memory to disc, thus allowing the use of very long source code up to the length of your disc. MACROM source code is tokenized and thus takes up far less room in memory or on disc than most assemblers.

- Operate in any mode
- Tokenized source code
- Assembles 6502 & 65C02 codes
- Automatically loads macros from library on disc
- Automatically loads subroutines from disc
- Macro library supplied plus demo files
- Chain program sections into main code
- Many different assembly options
- Converts BBC assembler code into MACROM source code
- Very fast & very flexible

In a comparison with ADE, MACROM was able to assemble a program to disc in 1 min 24 secs compared to 5 minutes with ADE and the source code took up 30% less room on the disc.

Ask for a data sheet today DEPT MU1

BROM PLUS £34.50 £30 DISC

BROM was yet another of our runaway successes and such has been the demand for extra features that we have now produced BROM PLUS. Most of the original BROM favourites are there plus a whole host of additional commands to aid you, the user.

Commands include:

- EDIT - a FULL SCREEN EDITOR, not to be confused with the line editor used in other toolkit ROMs
- ERROR ON traps errors and enters the EDITOR
- FIND all occurence of a string or keyword and enter the editor, TAB will find the next one and so on
- SCHANGE a search and replace facility
- LCOPY & LMOVE allow you to copy and move lines
- PACK is a very powerful routine which removes REMs & spaces and forms multi statement lines in a very intelligent way
- RENUM is a partial renumber facility
- XREF allows you to cross reference your program
- COMPARE a file against memory
- DEDIT a robust disc sector editor
- DFIND to search a disc for a string
- DGET/DPUT to load or save sectors
- FORM allows you to format up to 4 disc sides
- MENU to load programs from a disc with a BROM menu
- XCOPY to selectively copy files from disc to disc
- XDEL to selectively delete files from a disc
- MEDIT to view and edit memory - FAST
- ROMLIST lists all ROMs and their current status
- ROMON & ROMOFF which enable you to turn on/off sideways ROMs even after CTRL/BREAK.

"This is the best BASIC screen editor I have so far used."

MICRO USER August '85

40 80 3" ———— DISC
40 ———— 40 TRACK
80 ———— 80 TRACK
3 ———— 3" DISC - ADD £3
———— EPROM

Send for detailed newsletter
All prices inclusive of VAT & Carriage - NO EXTRAS! Please state 40 or 80 track disc and state D.F.S. you use

Clares
MICRO SUPPLIES

98 Middlewich Rd.,
Northwich, Cheshire CW9 7DA.
Tel: 0606 48511
Open 9—5pm Monday—Friday
LUNCH 12.30—1.30

It's back to pencil and paper . . .

Says NIGEL PETERS, as he continues his exploration of spreadsheets

WE have already used Mini Office II to create a simple spreadsheet using the three elementary operations of entering text, values and formulae. The values are the numbers – the raw data that the spreadsheet will work on. The text labels this data and the formulae tell the spreadsheet what to do with it.

These operations are the same for all spreadsheets, and most of what will follow in the next few months will also be generally applicable. So don't be put off if you don't have Mini Office, as you'll still be able to follow what I'm talking about.

While the spreadsheet program does the work of storing the text and numbers and doing the calculations you have to decide where everything appears on screen. You can't just tell it to multiply 4 by 5, you have to put 4 in a cell, 5 in another cell and use a formula to get it to multiply the contents of the two. You've also got to supply a cell for the answer to appear in.

While it sounds complicated it's actually quite easy and common sense. Yet paradoxically, just because a spreadsheet can be created so easily they often come to grief. This is a result of their not being planned or thought through beforehand.

Probably everyone who's used a spreadsheet has had the experience of suddenly realising halfway through that they've left something out, or they're faced with a vast array of unlabelled numbers and can't find the result they want.

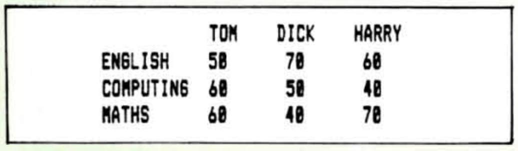
If the required number is the result of a formula this is solved by having the cursor roam around the spreadsheet until the required formula appears in the status area. A better way is not to let the thing happen in the first place.

So despite the fact that the spreadsheet program is designed to do away with paper and pencil I am now about to tell you to use them. But not to do the sums, just to design the layout of the spreadsheet itself before you start typing. A bit of thought as to where figures are going to be along with proper labelling saves a lot of heartache. Forethought saves time.

Some spreadsheets have very sophisticated commands that allow you to help correct mistakes in its structure, but it's better if the problem is avoided from the start. I promise you won't regret the time spent planning, nor will you regret labelling everything that appears.

Let's see how to create a simple spreadsheet using the data in Figure I.

This summarises the results of three boys – Tom, Dick and Harry – in three exams. What we want to know is the average mark each boy got in all three exams and the average mark for each exam. Of course we could just use our calculator, but from the grid-like way the data is held a spreadsheet seems to be called for. This is what we'll use, creating the spreadsheet shown in Figure II.



```
            TOM   DICK   HARRY
ENGLISH     50    70     60
COMPUTING   60    50     40
MATHS       60    40     70
```

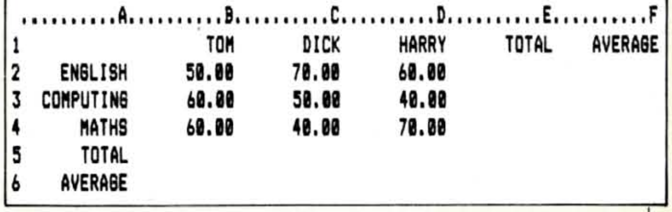
Figure I: Exam marks

While it's easy to see how the numbers in Figure II correspond to the data in Figure I there are some things to take note of. The numbers haven't just been chucked in haphazardly with Tom's English mark in A4, his maths in D1 and his computing result hidden away at F6.

It could be done this way and the formulae and figures could be combined to get a result, but it would be hard work and all too prone to error. You'd be chasing your data all over the place.

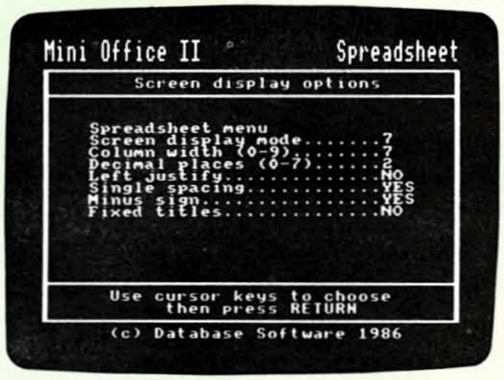
However it's obviously better to have the data more sensibly organised, as is the case in Figure II. Here all of Tom's marks are held in one column, column B. Dick's marks are in column C while Harry's are in D.

The data isn't just structured into columns, it's also structured in rows. We could have Tom's English mark



```
..........A..........B..........C..........D..........E..........F
1                   TOM       DICK      HARRY      TOTAL    AVERAGE
2    ENGLISH      50.00      70.00      60.00
3  COMPUTING      60.00      50.00      40.00
4      MATHS      60.00      40.00      70.00
5      TOTAL
6    AVERAGE
```

Figure II: The basic grid



```
Mini Office II                    Spreadsheet
            Screen display options

      Spreadsheet menu
      Screen display mode.......7
      Column width (0-9)........7
      Decimal places (0-7)......2
      Left justify..............NO
      Single spacing............YES
      Minus sign................YES
      Fixed titles..............NO

          Use cursor keys to choose
              then press RETURN
        (c) Database Software 1986
```

Figure III: Screen options

From Page 13

in cell B2 while Dick's English mark is stored in cell C3. Yet although possible, it would be a silly way of doing it.

Again Figure II shows a better way. Here all the English marks are held on row 2, the computing on row 3 and the maths on row 4. It's easier to understand and the simpler things are, the less likely that you'll make a mistake. Also the easier it is to track down any mistakes you have made.

So it's a good idea to think about the way that numbers will appear on the spreadsheet. A good structure saves time, trouble and tears. And labels with a good structure make things even easier.

Notice that in Figure II I haven't given a label to every separate figure. Instead I've given meaningful labels to the rows and columns and I can then use these as map references to get the name of any particular bit of data. Hence it's easy to see that the contents of cell B3 are Tom's computing results and D4 is Harry's maths figures. Row 5 will hold the totals of each of the lads' results while column E will hold the total marks for each subject.

It may seem a bit odd using the label TOTAL in each case, but its cross reference shows the difference. Hence E2 holds the sum of all the English marks, while C5 holds the total of all Dick's marks.

So far so good. We've got our data and thought up a structure to hold it and the results of our manipulations. However if you've tried entering it into your Mini Office II spreadsheet you may have come across a problem.

At the beginning each column is only seven character spaces wide and our label COMPUTING has eight characters. Don't panic. All you have to do is change the default values for the screen layout. Spreadsheets vary in how much and how easily you can change their layout. With Mini Office II it's quite easy to change the layout of the grid. All you do is select the:

Alter screen display

option on the main spreadsheet menu and you are confronted with the menu shown in Figure III.

As you can see, there are all sorts of options which you can explore at your leisure. For the moment let's concentrate on the parts that apply to our problem. What we want to change is the column width which is originally set to 7. Let's change it to 10 to give us lots of room. This is done by using the cursor keys to select the column width option, and pressing Return.

The program then asks you how wide you want it, so you enter 10 and again press Return. Then to get back to the main menu you select the spreadsheet menu option at the top of the list.

This takes you back to the main spreadsheet menu and choosing the Edit spreadsheet option allows you to get on with the job of entering the data. Try it out on your spreadsheet, attempting to get as close a copy of Figure II as you can.

Once we've done that we can move on to getting our spreadsheet to do our sums for us. Again our data is structured so that it's no problem getting it to do it.

To get the total of all the English marks it's easy to see that we add together the numbers in cells B2, C2 and D2 with the results going into E2. So the formula we put into cell E2 after remembering to press the red function key *f0* is:

B2+C2+D2

Now cell F2 is to be used to hold the average of the

```
..........A.........B.........C.........D.........E.........F
1                 TOM      DICK     HARRY     TOTAL   AVERAGE
2   ENGLISH     50.00     70.00     60.00  B2+C2+D2      E2/3
3 COMPUTING     60.00     50.00     40.00  B3+C3+D3      E3/3
4     MATHS     60.00     40.00     70.00  B4+C4+D4      E4/4
5     TOTAL  B2+B3+B4  C2+C3+C4  D2+D3+D4       ***       ***
6   AVERAGE      B5/3      C5/3      D5/3       ***       ***
```

Figure IV: The formulae used

```
..........A.........B.........C.........D.........E.........F
1                 TOM      DICK     HARRY     TOTAL   AVERAGE
2   ENGLISH     50.00     70.00     60.00    180.00     60.00
3 COMPUTING     60.00     50.00     40.00    150.00     50.00
4     MATHS     60.00     40.00     70.00    170.00     56.67
5     TOTAL    170.00    160.00    170.00       ***       ***
6   AVERAGE     56.67     53.33     56.67       ***       ***
```

Figure V: The resulting spreadsheet

DISKETTES All discs guaranteed and have lifetime warranty.

DATALIFE	10 of	**MIMIC**	10 of
40tk SSDD	£15.25	40tk SSDD	£11.00
40tk DSDD	£19.50	80tk DS Quad	£13.50
80tk Quad	£25.50		

BULK PACKS
by leading manufacturers such as Sony, Maxell, Fuji etc.

		10 of
5¼"	40tk SSDD	£9.59
	80tk DS Quad	£11.50

		10 of
3½"	SS 135tpi	£21.50
	DS135tpi	£25.50

All 5¼" discs supplied in library case.

Add £9 for a 50 capacity storage box with smoked perspex lid dividers and non-slip rubber feet.

ACORN INTERFACE	**£46**
ACORN DNFS	**£60**
8271	**£46**

ALL PRODUCTS
CARRIAGE FREE
VAT INCLUDED
NO MORE TO PAY

CD

CARSON DEVELOPMENTS (MU)
84 Highfield Road, Romford, Essex RM5 3RU
Telephone: 0708 27043

contex computing

Contex Bank Manager
Maintain Standing Orders

BANK MANAGER (disc only)
Manage your personal accounts with ease. Enter cheques and receipts. Standing orders any frequency. Automatic date sequencing. Reconcile statements. Search, amend and delete. Unreconcile. Move forwards or backwards. Analyse expenditure. Forward cash flow forecast. Up to 36 simultaneous 'bank' (bank, credit cards etc) accounts, 9999 standing orders , 99 analysis categories, 12 actual and 12 budgets per category, over 4,000 postings on an 80tk disc. Reports to screen or printer. Graphics. Foreign currency support. Password. File recovery. Auto exec. file. Field editing. Itemised look ahead. Programmable report writer.

For BBC, BBC+ and Master, disc	**£17.50**
Special version utilising extra BBC+ 128 & Master features, disc	**£21.50**
Optional 'business utilities' adding double entry trial balance report and programmable spreadsheet analysis report, disc	**£10.00**

TYPING TUTOR
Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Unique word scan line checking. Target WPM and percentage correct. You may revise the targets or change the lessons as required. Audio key click for positive key depression. Establish a typing rhythm using the automatic metronome: Free format option. Recommended. For BBC, BBC+ & Master. **Cassette £9.50 Disc £11.50**

SPREADSHEET Mk V (disc only)
The spreadsheet with input and printing command languages. Hundreds in use. We believe this is the most versatile disc based spreadsheet offering many more facilities than much more expensive packages. Models up to 1,000 cells and very easy to use. For BBC, BBC+ and Master, disc **£17.50**

As an additional service to the serious business user we can also supply . . .

Acornsoft Viewstore – very powerful database ROM	**£54.00**
Acornsoft Viewsheet – fast multi window spreadsheet ROM	**£54.00**
Acornsoft View V2.1 – super 40/80 col word processor ROM	**£54.00**
Acornsoft Printer driver generator – for View and Store	**£11.50**

ALL PRICES FULLY INCLUSIVE. FREE POSTAGE WITHIN UK.
Enquiries and Access credit card orders telephone 023 03 347

CONTEX COMPUTING, 15 Woodlands Close, Cople, Bedford MK44 3UE

Please rush me .... cassette ☐ 40TK ☐ 80TK ☐ ROM ☐

Enclosed £ or debit by Access card no ....

Name ....

Address ....

.... MU7

FAST DELIVERY

create programs ten times...

Faster

Imagine, 150 commands instantly at your disposal to enable you to create and write programs in a fraction of the time it would normally take, and they can be fully RELATIONAL with up to FIVE files open at any one time. Well, it's a reality!

Your programs will even run faster and more efficiently. We wrote a Card Index program using SYSTEM DELTA which outdates all other databases with its revolutionary features. Features which are too numerous to list here. It's fast, it's highly efficient and we are giving it away FREE OF CHARGE with each SYSTEM DELTA. If you are not convinced and want to know more complete the box below and we will be pleased to send you full specifications by return. *Master compatible*

A 'WORLD FIRST' IN PROGRAMMING

SYSTEM DELTA with free CARD INDEX	£64.95
SYSTEM DELTA REFERENCE GUIDE (For technical details and fully worked examples)	£19.95
VIDEO RENTAL APPLICATION	£54.95
MAILING LABELS/WORD PRO LINK	£19.95

Prices inclusive of V.A.T. and P. & P.

Please send me by return full details ☐ OR
I should like to use SYSTEM DELTA right away! Please send SYSTEM DELTA with free CARD INDEX ☐ and REFERENCE GUIDE ☐ MAILING L ☐ VIDEO RENTAL ☐

Cheque/Access Number ....
NAME ....
ADDRESS ....
....
....

Post to: MINERVA SYSTEMS, 69 SIDWELL STREET, EXETER, DEVON. EX4 6PH. Tel. 0392 37756 MU7.6

From Page 14

English marks. We could use the formula:

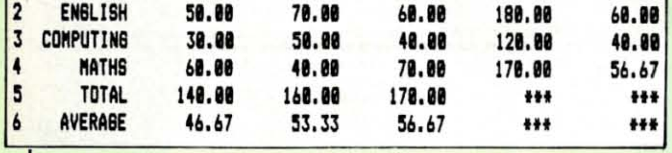
```
(B2+C2+D2)/3
```

but I prefer to use the simpler:

```
E2/3
```

as there's less chance of things going wrong should I put a bracket in the wrong place. Either way the result is the same – the average English mark is stored in F2.

The same process is followed for the average of all Tom's marks. The values in cells B2, B3 and B4 are totalled and held in B5. Then this value is divided by 3 and held in B6. I leave it to you to figure out the other formulae. If you want to check your results Figure IV shows the formulae, while Figure V shows what actually appears on the screen. I've just added the asterisks to make the display easier to read.



```
..........A..........B..........C..........D..........E..........F
1                  TOM       DICK      HARRY      TOTAL    AVERAGE
2    ENGLISH     50.00      70.00      60.00     180.00      60.00
3  COMPUTING     30.00      50.00      40.00     120.00      40.00
4      MATHS     60.00      40.00      70.00     170.00      56.67
5      TOTAL    140.00     160.00     170.00        ***        ***
6    AVERAGE     46.67      53.33      56.67        ***        ***
```

Figure VI: B2 is altered

If you find that Tom has cheated at his computing it's easy to change the value in cell B3 to, say, 30 and see the results ripple through all the other results. Figure VI shows what happens.

So that is a working spreadsheet. Of course in real life there'd be many more children and subjects. Also the teacher might want to extract a lot more information from it, rather than just our simple averages. But even in this basic form it shows the aspects of a well designed spreadsheet. It holds all the details in a structured, informative way and could be saved as a record of the class results.

However it's more than that. It's a model for the situation. Once you've got the spreadsheet set up you could use it for any class or set of subjects. The names and data may change, but the formulae and structure of the spreadsheet would stay the same.

● *You'll come to appreciate that these spreadsheets are powerful things and, as yet, we've hardly scraped the surface. More next month when we'll look at ways of making formulae easier to enter.*

Microdis

FREE CABLE AND PAPER

DISCOUNT!

SPECIAL OFFERS

Quen Data Daisywheel Printer	130.39	149.95
Juki 5510 186cps/nlq (colour option)	173.87	199.95
Challenger 256K	173.87	199.95
Challenger 256K to 512K Upgrade	31.26	35.95
Challenger 512K	195.61	219.95

DOT MATRIX PRINTERS	Ex VAT	Inc VAT & Carriage
Canon PW1080A (nlq)	233.91	269.00
Canon PW1156	334.74	384.95
Epson LX80 (new) 100cps Normal, 22cps NLQ Friction	199.95	229.95
Epson LX80 Tractor Attachment	18.91	21.75
Epson LX80 Sheet Feeder	48.65	55.95
Epson FX80 (160cps)	347.78	399.95
Epson P40 (Thermal, 80 col)	52.13	59.95
Juki 5510 Multicolour upgrade	97.20	111.78
DMP 2000 (Amstrad)	139.09	159.95
Epson SQ2000 (Ink Jet)	1529.82	1759.30

DAISYWHEEL PRINTERS

Daisystep 2000	199.95	229.95
Juki 6100 (Office quality Daisywheel)	252.13	289.95
Juki 2200 printer/typewriter	234.74	269.95

FREE! FREE! FREE!
WITH EVERY PRINTER
– LISTING PAPER + BBC LEAD
(£6 extra for Amstrad lead – phone for other leads)

LISTING PAPER

60 GSM (listing) 9.5" x 11" 2000 sheets	15.00	17.25
80 GSM (letter grade) 9.25" x 12" 2000 sheets	17.90	20.58
Labels – Box of 8000 (2 abreast on 9.5" backing with central perf.)	39.00	44.86

MONITORS –

Philips 7502 (Green)	74.74	85.95
Philips 7522 (Amber)	82.57	94.95
Colour 14" Screen		
Philips TV/Monitor	208.65	239.95
Mitsubishi Hi-Res	234.74	269.95

FAST SERVICE

24 HOUR HOTLINE
0783 872430

NOTE: ALL PRICES INCLUDE VAT + CARRIAGE

INCREDIBLE DISC DRIVE PRICES

HIGH QUALITY DISC DRIVES BY OPUS
with free 2 year warranty
Cased with leads, manual and utility disc, and even a power plug – ready to go.

5.25"	Ex VAT	Inc VAT & Carriage
Acorn 1770 DFS	40.83	46.95
Opus DDOS	40.83	46.95
SPECIAL OFFERS		
SX100 with DDOS	95.61	109.95
SX400S with DDOS	130.39	149.95
BBC SX (Uses BBC's Power Supply)		
SX100 40 track single side (100K)	69.52	79.95
SX400S 80 track double side (400K) 40/80	95.61	109.95
Dual Ex PSU		
DX200 Dual 40 track single side	130.39	149.95
DX800S Dual 80 track double side 40/80	173.87	199.95
With Built In Power Supply		
S100 40 track single side (100K)	82.57	94.95
S400S 80 track double side (400K) 40/80	113.00	129.95
Dual Drives (with Power Supply)		
D200 2 x 40 track single side (200K)	173.87	199.95
D400S 2 x 80 track single side (400K) 40/80	199.96	229.95
D800S 2 x 80 track double side (800K) 40/80	199.96	229.95

NOTE – All 80 track drives have a 40/80 switch!

Challenger 256k (upgradeable to 512K RAM) with 80 track double sided drive and disc interface	182.56	209.95
Challenger 256K to 512K Upgrade	31.26	35.95
Challenger 512K	195.61	219.95

3" DRIVES FOR THE AMSTRAD

DD-1 Drive + Interface	133.00	152.95
FD-1 (No Interface)	86.04	98.95

MICROVITEC RGB MONITORS (BBC)

1431 (472 x 585 dots)	182.57	209.95
1431 APMS4 (with audio & PAL)	199.96	229.95
1451 (653 x 582 dots)	234.74	269.95
1451 APMS4	299.09	343.95

Dept. MU786, 46 Middle Street,
Blackhall, Hartlepool Cleveland
TS27 4EA. Tel: 0783 872430

Sorry, office only – No callers without appointment

BBC ROM UTILITY SOFTWARE

Wordwise (Word-processor)		31.26	35.95
Wordwise Plus (Word-processor)		40.65	46.75
View 2.1 (Word-processor)		41.26	47.45
View III (Word Processor)		61.00	70.15
Ultracalc II	(Spreadsheet)	57.35	65.95
Printmaster	(Printer graphics)	23.91	27.50
Graphics ROM	(Computer Concepts extensions to Basic)	23.91	27.50
Help	(on Basic keywords etc)	23.44	26.95
Sleuth	(Basic debugging tool)	26.48	30.45
Communicator	RS432 & terminal)	48.17	55.39
Disc Doctor	(Disc utility)	23.91	27.50
Replica 2	(Backup tape to disk utility)	10.43	12.00
Betabase	(Database Disk)	20.00	23.00

COMPUTERS

BBC B+ 64K	382.67	439.95
BBC B+ 128K	417.35	479.95
Master 128	426.04	489.95

AMSTRAD COMPUTERS

PCW8512	469.52	539.95
PCW8256	356.49	409.95
CPC 6128 (Green)	247.78	284.95
CPC 6128 (Colour)	321.70	369.95

OTHER BBC PERIPHERALS

QFS 2.0 BBC Disc Interface	60.82	69.95
Penman plotter/turtle/mouse	217.35	249.95
Teletext Receiver	188.95	217.29
6502 Second Processor	177.50	204.13
Z80A Second Processor	312.95	359.89
ATPL ROM Board	39.09	44.95

MEDIA – ARCHIVE DATA – EX DYSAN FACTORY! (Fully guaranteed)
High quality diskettes 5.25" boxed in 10's with FREE plastic library case

40 Track SSSD	9.13	10.50
40 Track DSDD	9.52	10.95
80 Track SSSD	12.83	14.75
80 Track DSDD	11.74	13.50
3" Disc (10)	37.35	42.95
3" Disc (each)	3.91	4.50

HEAD CLEANING KITS

3M Standard	13.87	15.95
Rexel Drive/KBD/VDU Cleaning Kit	19.96	22.95